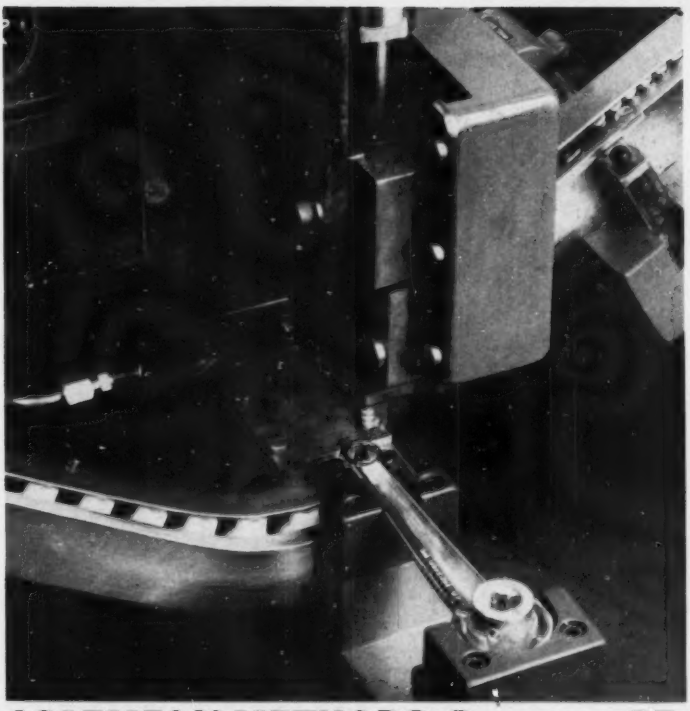
# DIE CASTINGS

INCLUDING A SPECIAL FINISHING SECTION

August
1951



**ASSEMBLY METHODS-See page 35.**

THE PRODUCT DESIGN MAGAZINE FOR USERS AND POTENTIAL USERS OF DIE CASTINGS

# How True To This Form Is Your Present Casting Source?

| | (CHECK HERE) TRUE | FALSE |
|---|---|---|
| **1.** Our present casting source provides the highest financial rating based on sound principles of operation. | ____ | ____ |
| **2.** It has the necessary facilities to supply both aluminum permanent mold **and** aluminum and zinc die castings from one source. | ____ | ____ |
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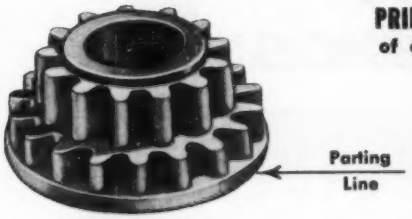
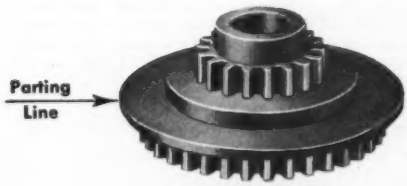
# DO's and DON'Ts in DESIGNING ZINC and ALUMINUM DIE CASTINGS

## examples by DOLLIN




CLUSTER A




CLUSTER B

**PRINCIPLE:** **To hold closest dimensions between elements of a part, keep them in the same die component.**

**EXAMPLE:** It was possible to obtain greater concentricity between the pitch diameters of the two gears in Cluster A than could be obtained between those in Cluster B.

**REASON:** The two gears of Cluster A could be cast in the same half of the die. In cluster B, the upper gear had to be cast in one half of the die, and the lower gear in the other half. Thus greater tolerances were required between the gears.

**WHEN YOU DEAL WITH DOLLIN** you can be sure that every one of your exacting requirements will be fulfilled. You can also be sure that Dollin engineers will suggest any changes that will mean a better product produced more efficiently.

Our broad facilities — which include large plunger zinc machines, large and medium-size cold chamber high pressure machines, and a separate small castings department — permit low cost production of die castings through all commercial sizes. Send prints or samples for quotation — engineering advice provided at no obligation.

**The gear clusters shown above were made in Dollin's**

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**AUGUST 1951**
**Vol. 9 No. 8**

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ABC

COVER—THE WISE DESIGNER thinks of the method of assembling while he is drawing up the part and plans a type of fastener which is practical, rapid, inexpensive and suitable for his production line. Shown on the cover is a particularly efficient setup using a hopper fed power screwdriver. For a survey of methods, fasteners and equipment especially adapted for assembling die castings, turn to page 35.

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# LETTERS *to the Editor*

## MACHINING ORDNANCE COMPONENTS

As usual, we have examined with interest your recent June issue of "Die Castings". We note particularly the small cut of an automatic machining operation on Page 16. It illustrates a similar operation to one we have been considering.

In this connection, we are wondering if it is possible to obtain through your office the maker of the machine illustrated.—C.W.A.

*We do not have a record of the maker of the machine, but have turned the inquiry over to the New Jersey Zinc Company in whose advertisement it appears. Perhaps they will be able to dig this information out of their files.*

*By coincidence, the July issue of Die Castings contains a story about a machining operation on a similar type of part which was used as a tip for tracer bullets during the war. Although a different machining operation was required, namely, a turning operation to establish proper balance, the company which manufactured the special tools for the job was the Scully-Jones Company of Chicago. This job was set up to remove slight variations due to center-line shifts between die halves.—Ed.*

## SAFETY RAZOR

Some time ago you ran an article describing a special type of safety razor with a curved head. I would appreciate knowing the name of the manufacturer.—R.P.

*The safety razor was produced by the Ehrco Die Casting Service, Stamford, Conn.—Ed.*

# *Double Duty Page of Timely Importance*

## MADISON-KIPP DIE CASTINGS

The die cast components for grinders here illustrated have a requirement basic to hundreds of other components for mass production in civilian or military usage — uniform accuracy, close concentricity and parallelism, thread strength and alignment, lightness and smooth finish.

No other process is so flexible; so adequate in solving so many production problems as the Madison Kipp Hi-High pressure die casting process.

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Aluminum Electric Iron Sole Plate Die Cast by Alcoa.

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Did you know that some of the biggest and most complex die castings are made by Alcoa? (The dog on the side of Greyhound Buses, for example.) That Alcoa Die Castings are now used for highly stressed parts? (The Nash clutch housing is one.) That many electric iron soleplates are die cast in aluminum by Alcoa for heat conductivity and light weight.

Before you buy your next die castings, do this. List the properties that you need most for the job. Then compare all the die casting metals for properties such as:

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***Lightness***—Will your die castings be used for moving parts or products that must be portable? An aluminum die casting can weigh ⅓ as much as heavy metals.

***Conductivity***—Will your die castings need good heat transfer properties? Alcoa aluminum die castings will do the job best.

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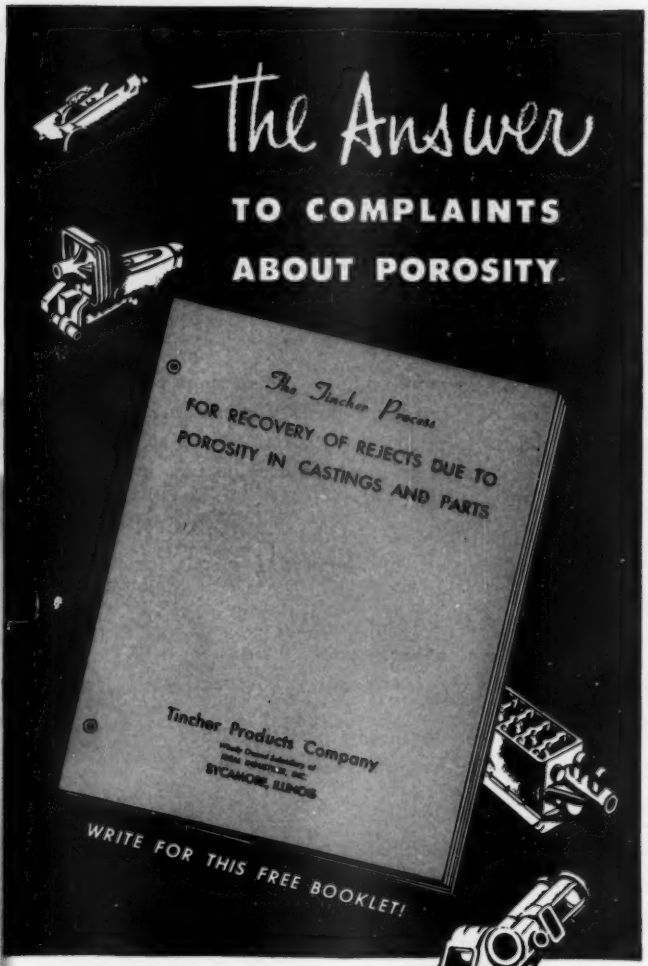


When machining operations disclose porosity in castings, here's the way to handle complaints and maintain good will with customers. Simply suggest that they write for this booklet, "THE TINCHER PROCESS." It explains, in concise question-and-answer form, how The Tincher Process converts rejects due to porosity into perfectly sound castings.

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## LITERATURE AND SERVICES OFFERED IN THIS MONTH'S ADS

NOTE: Circle numbers on the enclosed postcard to indicate literature, samples or trial services you wish to receive.

No. 1. PYDRAUL F-9 HYDRAULIC FLUID is described in Technical Bulletin No. O-D-602, available from the Monsanto Chemical Co. F-9, a non-flammable compound, was developed primarily for use in die casting machines.

No. 2. LITERATURE AND DESIGN INFORMATION on aluminum and magnesium die castings are available from Litemetal Dicast, Inc.

No. 3. "HOW TO DIMENSION PRINTS FOR DIE CASTINGS" is the title of a booklet offered by the Newton-New Haven Co. The booklet gives detailed instructions for guidance in dimensioning die casting drawings.

No. 4. SAMPLES OF TINY DIE CASTINGS and bulletins covering production facilities are offered by the Gries Reproducer Corp. This company specializes in very small zinc die castings.

No. 5. DIE CASTING, machining, painting and plating facilities of the Admiral Die Casting Corp. are shown in a bulletin offered by the company.

No. 6. EXAMPLES OF DIE CASTINGS in zinc and aluminum made by the Tri-State Die Casting Corp. are presented in a catalog offered by the company.

No. 7. A FOLDER DESCRIBING THE MONARCH Aluminum Mfg. Co.'s plant and its zinc and aluminum die casting facilities is available from the company.

No. 8. "WE'RE GEARED FOR YOUR DEFENSE NEEDS" is a booklet explaining the Advance Tool & Die Casting Co.'s facilities for producing die castings.

No. 9. BURNISHING BALLS AND SHAPES and suggestions on how to use them are contained in a catalog issued by the Abbott Ball Co. The company manufactures burnishing shapes made of bearing ball steel in many shapes and sizes.

*(Continued on Page 12)*

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## LITERATURE AND SERVICES

*(Continued from Page 8)*

No. 10. FILTERS FOR HYDRAULIC SYSTEMS are described in Folder 105, offered by the Marvel Engineering Co. These filters have no moving or wearing parts.

No. 11. ENAMEL FILLING OF RECESSES in die cast parts is illustrated and described in literature available from the Acromark Co.

No. 12. A FINISH SIMILAR TO CHROME can be obtained by coating a bright zinc plate with Iridite, according to Allied Research Products, Inc. A company technical bulletin gives the details.

No. 13. "ADVANCED BARREL FINISHING" is the title of a booklet offered by the Almco Division, Queen Stove Works. The booklet gives details of the Supersheen method of controlled barrel deburring, grinding and polishing.

No. 14. ELECTRICALLY-CONTROLLED AIR MOTORS and other controlled-air devices built by the Bellows Co. are shown in Bulletin CL-30. Wiring diagrams, dimensions and other technical data are given in the bulletin.

No. 15. BACKSTAND BELT GRINDING AND POLISHING and its advantages over other methods are discussed in a Coated Abrasives Div., Armour & Co., booklet. The booklet also shows equipment needed for backstand belt work.

No. 16. BARREL FINISHING with compounds manufactured by the Minnesota Mining & Mfg. Co. is covered in a booklet published by the company. The booklet shows typical metal parts before and after barrel finishing, and makes recommendations for the proper grade of compound to be used.

No. 17. A COMPACT, COMPLETELY AUTOMATIC DRILL HEAD with self-contained air and controlled feed and speed is described in a catalog offered by the Dumore Co.

*(Continued on Page 14)*

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This was accomplished by casting a steel sleeve into the walls of the shank, as indicated by the arrows in the illustration. Note that the sleeve is imbedded in the shank so that it is covered by the zinc alloy on both the interior and exterior surfaces.

MILWAUKEE Engineers were called upon to solve the rather difficult problem of casting the steel sleeve into the cylindrical wall of the shank, accurately.

Another feature of this die casting is the cast-in "bottle thread" in the circular filter-base which permits the filter unit to be screwed into position. In fact, this casting is delivered to the customer ready-for-assembly without further machining of any kind.

**MILWAUKEE DIE CASTING COMPANY**
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### LITERATURE AND SERVICES

*(Continued from Page 12)*

No. 18. AN ELECTRO-CLEANER AND SURFACE CONDITIONER designed especially for use on zinc-base die castings is described in a Diversey Corp. bulletin. Diversey No. 505 is used for reverse-current electro-cleaning and surface conditioning.

No. 19. SAMPLE PARTS WILL BE PROCESSED FREE of charge in Globe tilting tumbling barrels. Information on this service is available from the Globe Stamping Div., Hupp Corp.

No. 20. MOULDLUBRIC 306, a die lubricant which can be brushed or sprayed on die casting dies, is described in literature available from E. F. Houghton & Co.

No. 21. THE TINCHER PROCESS, which is an impregnation process used to seal porosity in die castings, is covered in a booklet offered by the Tincher Products Co.

No. 22. AN AUTOMATIC METAL FEEDER which handles ingots of any die casting alloy and is used to maintain the level of molten metal in the pot is described in literature obtainable from the Lake Calumet Smelting Co.

No. 23. AM CLEANER, a non-etching cleaner specifically compounded for aluminum alloys, is covered in technical data sheets available from the Cowles Chemical Co.

No. 24. "HOW TO CLEAN METALS IN AIRCRAFT PRODUCTION" is the title of a booklet offered by Oakite Products, Inc.

No. 25. A BRIGHT FINISH FOR DIE CASTINGS which is made up of a .0003 zinc plate and a Unichrome Clear Dip treatment is described in Bulletin CD-3, offered by United Chromium, Inc.

No. 26. SAMPLES AND LITERATURE on the Tap-Lok screw thread insert will be sent by the Groov-Pin Corp. The Tap Lok insert cuts its own thread in cored or drilled holes and is made of hardened steel.

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## THE METAL

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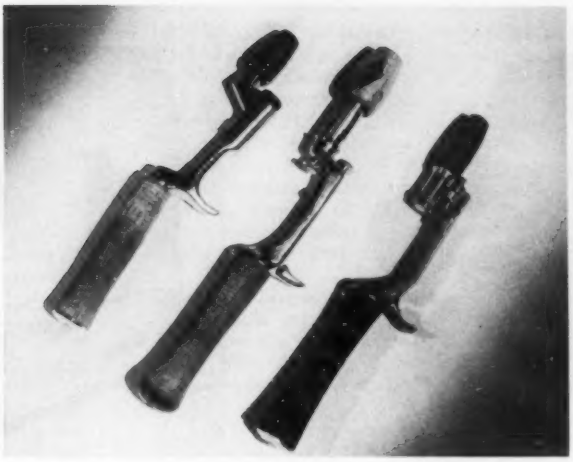


**1.** LIGHT, STRONG AND CORROSION resistant, bait casting rod handles like the ones on the left almost universally use aluminum die castings to give a superior product at a competitive price.

# WELL HANDLED FOR CASTING

AMERICAN sportsmen spend millions of dollars yearly for fishing rods, reels and allied equipment. Although die cast parts are used in some makes of fishing reels, one of the most extensive applications of the process is in the manufacture of handles for bait casting rods.

As is the case in selling other luxury products, successful merchandising of fishing rod handles depends upon satisfying the customer both from the utilitarian and the esthetic standpoints. The handle must have a pleasing appearance and grip, and must also be practical and durable.

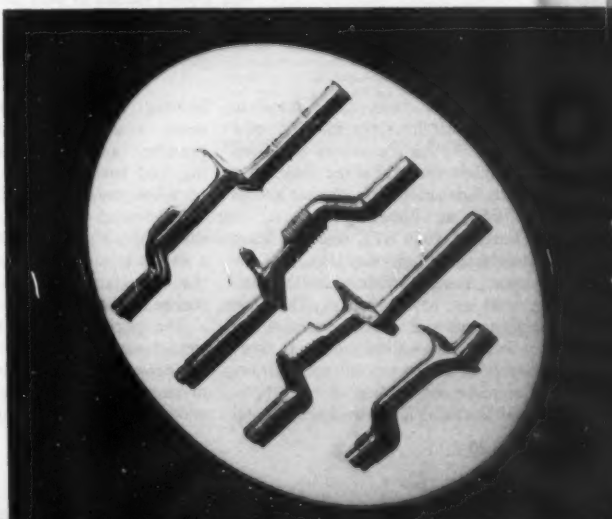
For the above reasons, many of the handles being produced today utilize aluminum die castings. Grips for these handles are cork, plastic or some other suitable material.

The die castings vary mostly in size, trim and the provisions made for locking the reel to the handle. Usually they take a shape similar to one of these shown in Figure 2. Provision is made on many of the handles for molding a plastic grip directly on the handle, with ribs cast in for strengthening the casting and securing the grip. Those handles having a cork grip must have a hole cored and tapped in the end to take a cap screw which holds the grip in place.

The problem of holding the reel securely in place has been solved in a number of ways. A slot is cored or milled at one end of the reel seat to hold one of the reel prongs; the other reel prong is held either by a locking ring turning on threads cast integrally with the handle, or by a lock-

*(Continued on Page 62)*

**2.** CAST-IN THREADS and cored holes feature the aluminum die castings shown below. Note the ribs on some of the castings. These serve to hold firmly in place the plastic handle, which is molded directly on the die casting.



**1.** USING ONE BASIC DIE CAST housing unit, a line of four slide projectors has been developed. Accessory fittings, lens, choice of finish coating and trim make the difference between Model A, *left*, and Model D, *right*. Model at left has a grayed-green hammered type enamel, while the model at right has a light colored satin finish enamel.

# 4 in 1

**By variation of surface finish, introduction of different lenses and refinement of accessories, four distinct models of slide projectors have been designed around one basic die cast housing.**

A SWITCH from sheet metal to die cast housings for the new line of Skyline Projectors has been a complete success for the Society for Visual Education, Inc. (better known as SVE), of Chicago.

Early in 1950 SVE retained Mast Development Company, Inc., of Davenport, Iowa as their consulting engineers on new products. The first assignment was to develop a new line of lower priced slide projectors thoroughly in advance of all competition. The result was a line of four units.

Although SVE has used sheet metal housings on all their projectors for many years, Bertel Kleerup, vice president and director of engineering, had been experimenting for the past few years with sand cast aluminum housings for special models, and thus when Mast engineers suggested a switch to aluminum die casting for the new large volume design, the change met with ready approval.

The specifications for the new projectors were wide open; SVE felt the engineers should not be bound by any previous practices or by trying to make use of any existing tooling or standard parts. Instead a careful survey of user requirements was made and the reason for choosing this or that machine was studied.

Results of the survey showed that:

1. the consumer wanted a machine with as high wattage lamp as possible;

2. he wanted to put his slides in and take them out the same side of the projector;

3. the thing he liked least was burning his fingers on a hot projector housing.

In addition, it was observed that

in general the buyers were very much eye-minded in their selection, and having almost as many kinds of projectors to choose from as makes of refrigerators, they were inclined to choose the one that (a) stood out from the herd, and (b) looked like the most for the money.

With this information in the folio, the Mast engineers, under the direction of Wright K. Gannett, chief engineer, set out to find a way to reduce the heat of a projector housing. A series of experiments and test models proved that:

a. the exterior die cast housing had to have the minimum physical heat conducting connection to the chimneys;

b. three concentric chimneys were needed to dissipate the heat and prevent its reaching the housing;

c. no horizontal obstructions to air flow could be used at the top of the chimney to trap the light.

Because the smaller, cheaper, bayonet base lamps were actually slightly more efficient and because such effective means of cooling were worked out, this type of lamp was adopted for the whole line from 200 watts to the 300 watt models.

Because a blower helps to cool the projector to below body temperature so that it actually feels cool to the touch in a 70° room, a blower was made standard equipment on the 300 watt, B, C, and D, Models, and optional on the 200 watt, Model A. 300 watt models are the highest wattage in demand for home use and have in the past usually fallen in the high price, low production class.

### Only One Machining Job

By using a bayonet base that would take any lamp from 75 watts to 300, providing adequate cooling so that no harm could be done by putting the high wattage lamp in the low wattage models, it has been possible to create a line of equipment in the medium priced bracket which covers the entire range of home requirements plus many school and commercial needs.

The use of a die cast housing, requiring only a single machining operation before assembly, plus the generous use of plastic moldings which likewise have high accuracy without machining, cut assembly costs so that quantity sale as well as quantity production are possible.

To satisfy the appearance requirement, no medium could be found more flexible and suitable than the die cast housing. It permits the complex form and requirements to be met in one part and thus makes possible a smooth blending of shapes and line that lead to an almost sculptural quality in the final design, Figure 1.

Mast engineers have found through long experience in engineering and styling that the only way to obtain "sculptural" unity of design is by working and modeling the product in three dimensions. Consequently many hours were spent in careful, painstaking, full-size studies in clay.

When the final basic shape was arrived at, a wood model was made, and finished with such precision that after it had been used for a mockup to obtain the final executive check, it required only a little touching up before turning it over to the die caster as a Kellering model.

As a die casting this housing has an exceptional depth of 8-1/4", and so requires a 20" x 24" die with a total pile up of 33" (including the ejection arrangement).

An exceptional feature of the die casting of the housing is the ejection; ejection is from the cavity die. There are side cores; for the slide changer openings on the side, for the switch opening on the back, and the lens opening on the front. Three side cores hold the casting in the cavity die as it is stripped from the punch or core die. The resulting ejection is easy; after the side cores are pulled, the part is ejected by pins over the lens tube opening, an unfinished surface later covered by the plastic nameplate.

The opening for the manuscript window is also on a side core, and the die is so designed that this core is interchangeable so that the manuscript window opening may be omitted from the low priced model in the line.

Finishing of the die casting suitable for a grayed-green, hammered

**2. CORED OPENING above the lens barrel opening provides a method for reducing the amount of metal around the lens barrel support, and also gives access for attaching the lens barrel. Notice the sculptural quality revealed by this photo of the raw casting, made possible by the sharp detail and almost unlimited possibilities for contour development permitted by die casting.**

3. EJECTED FROM THE CAVITY half of the die, the housing casting is held there by three side cores while being stripped from the core half of the die. Then ejector pins located at points which are later concealed, easily push the casting from the die.

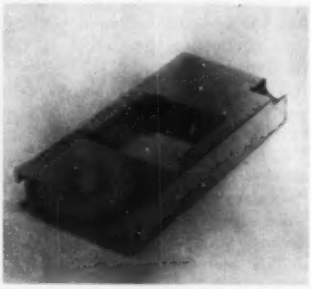
type finish or for the satin finish used on the top model in the line has been found to be somewhat time consuming, but it is anticipated that as the die wears in and some further refinements are made on the injection conditions, finishing will be reduced.

The castings for the satin finish are selected from the production since this finish requires extremely clean, smooth surface, generally found on only a small percentage of a normal run.

A die casting is also used for the body of the de luxe slide changer, shown in Figure A.

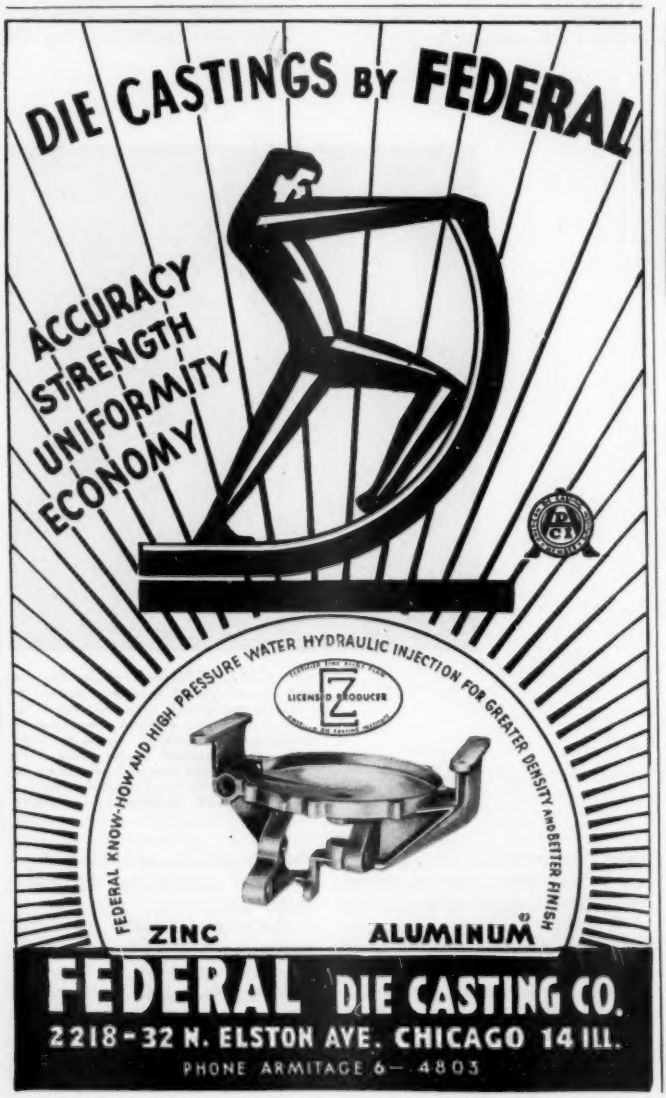
In this case the die casting is an extremely thin walled, difficult zinc part. Some of the walls are only .030 thick, while the total depth of draw is 5".

This slide changer has the new feature that makes it possible for the user to put the slides in on the right hand side of the projector and withdraw the previously shown slide on the same side. Since in showing slides



4. WALL SECTIONS .030 THICK with total depth of 5 inches are features of this slide changer die casting used on the deluxe models.

it is usually most convenient to take them out of a slide file case and return them to the case, this type of slide changer provides a maximum possible convenience in slide changing. It also masks the screen during the changing of the slide so that no movement of the slide is shown on the screen during changing.



## L. E. MOORE ELECTED

Lawrence E. Moore, controller of Vanadium-Alloys Steel Company, Latrobe, Pennsylvania, has been elected a director of the Pittsburgh Control of the Controllers Institute of America. Mr. Moore is a graduate of Washington and Jefferson College and took graduate work at Duquesne University and at the Robert Morris School of Business. He is a member of the Pennsylvania Institute of Certified Public Accountants.

## PIGOTT NOMINATED ASME PRESIDENT FOR 1952

The nomination of Reginald J. S. Pigott, director of the engineering division of Gulf Research & Development Company of Pittsburgh, a

## WANT TO KNOW THE BEST WAY TO ASSEMBLE DIE CAST PARTS . . . . . ?

**A number of types of fasteners and machines are especially suited for assembling die cast parts on a production basis. Some of them are faster than conventional methods, some are cheaper, and some have superior holding power.** ***For a complete survey of these methods, materials and machines, turn to page 35.***

**When you have studied the survey, you may want additional, specific information about some of these assembling processes, or may want catalogs giving standard sizes and types of fasteners. If so, circle the appropriate number on the Reader Service Card, as indicated below:**

248. SELF TAPPING SCREWS
249. SPRING-TYPE LOCK NUTS
250. TUBULAR SPRING FASTENER
251. MACHINES FOR RIVETING, PEENING, ETC.
252. SCREW THREAD INSERTS
253. HOPPER FED POWER SCREWDRIVERS
254. POWER NUTDRIVERS
255. TAPPING HEADS
256. AIR CYLINDERS FOR HOLDING, ETC.
257. SMALL HYDRAULIC PRESSES


subsidiary of Gulf Oil Corporation, as 1952 president of The American Society of Mechanical Engineers, was announced recently. Mr. Pigott heads a slate of new ASME nominees, including four regional vice presidents and two directors-at-large, submitted by the society's nominating committee. Since only one name is presented for each office, nomination is tantamount to election.

Election will take place in the fall by letter ballot of the membership, which totals more than 33,000 engineers. The new officers are to begin their terms at the conclusion of the ASME annual meeting next December. Mr. Pigott will succeed J. Calvin Brown, of Los Angeles, Calif., engineer and patent attorney.

### McNALLY APPOINTED NEW ENGLAND REPRESENTATIVE

Industrial Supplies & Equipment Co., Greenwich, Connecticut, specialists in barrel finishing operations, has announced the appointment of Charles McNally of Byfield, Massachusetts, as sales engineer in charge of eastern New England.

A graduate of the University of New Hampshire, Mr. McNally is both a chemical engineer and a mechanical engineer. He secured his early metal working experience with Scott and Williams in Laconia, New Hampshire where he became a tool maker. Joining General Electric as a tool and die maker, he was soon transferred to methods and planning and then assigned to the metal finishing department. For many years, he has been a member of the Boston branch of the American Electroplaters Society.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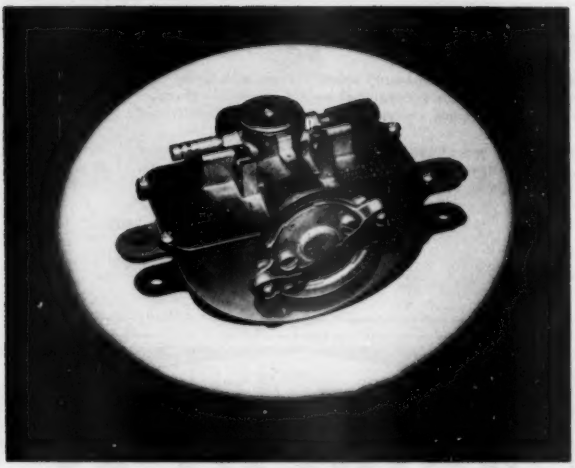
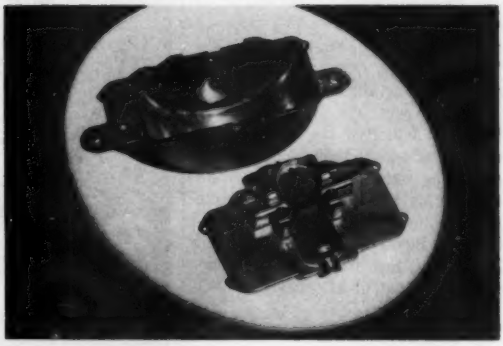


**1. INSTEAD OF LARGE INVENTORIES** of windshield wiper motors formerly needed by garagemen for replacement units, it is now possible to replace any vacuum type windshield wiper motor on all 1935 or later cars with one of six models manufactured by The Anderson Company. All of these models, one of which is shown *left*, take advantage of the accuracy of die cast zinc for housings.

**2. TO MAINTAIN VACUUM** inside the piston raceway, extremely close concentricity tolerances must be held by the die caster. This is especially true of the relationship between the bearing seats in which the piston shaft rotates, and the inner arc swept by the reciprocating motion of the piston.



# CLOSE TOLERANCE ON CONCENTRICITY

SOME of the tightest production tolerances in the business are being successfully maintained on die castings for automobile windshield wiper motors manufactured by The Anderson Company, Gary, Indiana.

Few jobs being die cast in large volume attain such close dimensional control and high quality surface condition. The efficiency of these vacuum type windshield wipers depends, to a large extent, upon the ability of the die caster to hold concentricity tolerances, to produce castings with sound interior surfaces and to avoid warpage during ejection.

Operation of the Anco windshield wiper motor involves an airtight piston sweeping in an arc inside of a curved, enclosed raceway. The automobile intake manifold vacuum permits atmospheric pressure to push the piston forward inside the motor to a preset arc and then the air is valved out through another opening to release the piston for its return stroke.

Function of the piston which drives the mechanism to the windshield wiper blade depends upon a perfect seal between the piston and the raceway for full vacuum efficiency. This all important raceway is the interior surface of the housing, shown

in Figure 2, produced as a zinc die casting. Mating with this piece is another closely dimensioned piece, a cover casting also shown in Figure 2.

The die caster has developed unusual skill in holding the necessary limits on concentricity between the piston shaft bearing seat and the raceway, as in Figure 2. The permissible limits are considerably closer than is regarded as standard die casting practice, and to complicate the problem, only negligible draft allowances can be given on the straight sides of the raceway.

The piston is a fabricated metal piece with fabric liner, and it is lubricated by an internal grease packing. The fit of this piston against the surface of the raceway is so important at every point of its arc that the die castings are subjected to a 100 percent visual inspection for slight nicks or flow marks. After assembly of the motors, they are also given a 100 percent performance test on an air line which promptly shows up any leakage of air around the piston or excessive friction of piston and shaft.

up during ejection due to virtually no-draft sides. Obviously, a twisted raceway could not be used, nor could a warped top surface be gasketed.

The as-cast surface on the raceway is the best possible working surface for the piston, and the dense "skin" is always left uncut. Where minute surface defects occur, it is occasionally possible to salvage the casting by a light burnishing which has a cold working action but removes no metal. Where any deep foliation, cold shot, nick or scratch is found, the casting must be rejected.

The only secondary operations performed on this lower part of the housing are to disc sand the top surface to remove ejector pin marks, and to tap eight small cored holes used for assembling the top die casting.

Hopper fed power screwdrivers are employed for this assembly operation because it is the fastest method of inserting and driving small machine screws.

Included in the current large volume production of these windshield wipers are substantial quantities being

shape is the cover die casting which contains all of the intersecting internal passageways used for valving and adjustment. Tolerances on this part are held extremely close, also.

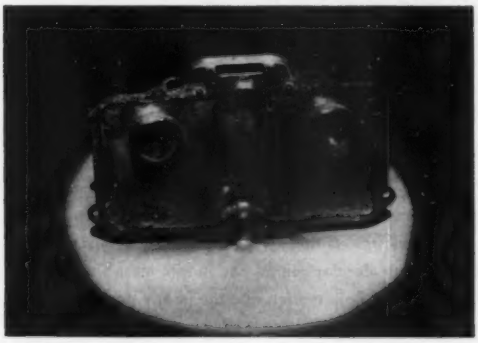
As can be seen in Figure 3, the upper halves of the bearing seats for the piston shaft are formed in the cover casting. Dimension, concentricity and alignment of these surfaces must be held to the same tolerances as those on the lower casting.

Four small studs formed on the underside of the cover casting, mate with four cored holes in the lower casting to guarantee alignment between the two castings.

The cost of tooling to core the small intersecting passageways would be higher than to drill them with multiple spindle drill heads. Holes in top and side are drilled, and the valve seat is faced by milling.

The success of these vacuum type windshield wipers is accomplished to a large degree by the accuracy of the casting of two housing components. The die casting process is the logical way to fabricate them. While the lower housing could be formed by deep drawing, there are a number of factors which would make this undesirable.

First, it would necessitate several drawing operations with heat treat-



**3.** FLATNESS is another critical consideration. Underside of this die cast cover must seal perfectly against the lower housing, and must align with the shaft bearings on the lower housing. Mating bosses and cored holes help guarantee this alignment.

**4.** SMALL FITTINGS like this housing for the worm and pinion cable control, are well suited for die casting in zinc.

Two other conditions must be watched with regard to these housing parts—presence of porosity and freedom from warpage. Considerable development work was required by the die caster to determine the most satisfactory placing of the ejector pins so that there would be no hang-

made under government contract to be used as replacement parts on military vehicles. In addition to the dichromate dip which all of these die cast zinc parts get for protection against white corrosion, the military models are painted olive drab.

Somewhat more complicated in

ment in between which would be slow and expensive; second, tool costs would be higher for several blanking, forming and piercing dies; and

*(Continued on Page 61)*

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of

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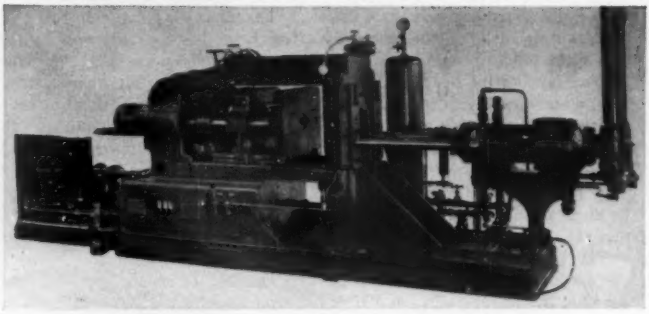

Lester-Phoenix Die Casting Machine, Model HHP-3x-S. Another quality machine protected by Marvel Synclinal Filters as Original Equipment of Manufacturer.

Photo courtesy Lester-Phoenix, Inc., Cleveland, Ohio

# MARVEL SYNCLINAL FILTERS

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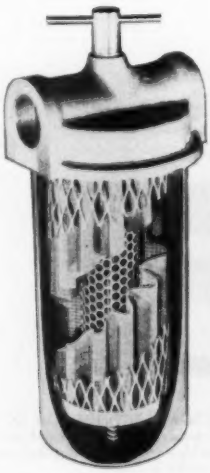

SUMP TYPE (Cutaway)

LINE TYPE (Cutaway)

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Marvel filters are available in sump and line models, in capacities from 5 to 50 g.p.m. (multiple installations effect greater capacities) and in wire mesh sizes from 30 to 200. Both models operate in any position and may be easily disassembled, cleaned and reassembled by ordinary help; cut non-productive time and labor to a minimum. Line models may be removed without disturbing pipe fittings. For efficient filtration of non-corrosive liquids investigate Marvel Synclinal Filters.

*Write for Folder 105*

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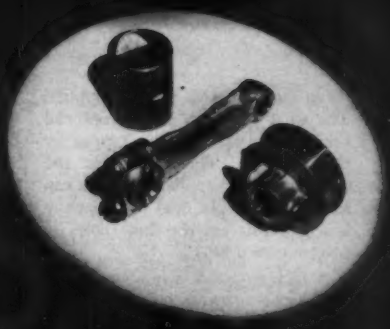
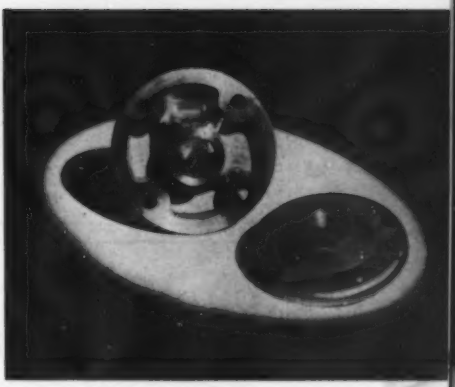


DIE CAST IN ZINC alloy, the pulley, connecting rod and crosshead shown at *left* change the rotary motion of the motor to a reciprocating motion. The end bearing cover and the pressure switch base are shown at *right*.



# Low Cost Power Transmission Elements

By
R. H. SCHOENING
Chief Engineer
Dayton Pump & Mfg. Co.

ALL too often, designers approach a power transmission problem with the attitude that parts used for this purpose must be very strong, *disregarding other factors that bear on the problem.* The result of such an approach is usually higher manufacturing costs caused by the excessive machining required to bring the material to the desired dimensions.

Many designers have discovered that when power transmission parts are not subject to excessive abrasion or high stresses, die casting such parts will often reduce manufacturing costs without impairing in any way the functional ability of the product. The large number of gears, linkage parts, cams and pulleys that have been produced as die castings attest to this fact.

As a part of a line of home water pressure systems, the Dayton Pump & Mfg. Co. of Dayton, Ohio, manufactures two low-cost shallow well water pumps as "price leaders." Die castings are used for several functional parts in these pumps as a means of reducing manufacturing costs while maintaining durability and quality.

The pumps are designed to furnish water pressure to farm homes, cottages, rural filling stations and other dwellings lacking water main facilities. They will pump water from cisterns, wells, rivers and ponds from a total lift of 22 feet. The pumps are rated at 250 or 350 gallons per hour, and are controlled by pressure switches which start the pump when the pressure drops to 25 psi and stop it at 45 psi. The pump can be purchased as a unit or mounted on a storage tank.

Power to operate the pump is supplied by a ¼ hp, 60 cycle, single phase, 110 volt a. c. electric motor with a thermal overload protector. Since the pump is a reciprocating type, the rotary motion of the motor must be transformed into a reciprocating motion. The die cast parts are all used to effect this transformation, except for the pressure switch mounting pad.

A zinc alloy pulley is mounted on the motor shaft, which drives the crankshaft through a V-belt. The end bearing cap, also a zinc alloy die casting, permits easy access for re-

A DAYTON shallow well water pump is shown below mounted on a pressure tank. These pumps will deliver water from wells with a total lift to 22 feet, and at a rate of 250 or 350 gallons per hour.

moval of the crankshaft and also carries one of the two crankshaft bearings.

The other zinc alloy parts are the connecting rod and the crosshead. They are similar in appearance to the connecting rods and pistons used in internal combustion engines. A stainless steel rod connects the crosshead to the pump piston. The crosshead and connecting rod run submerged in an oil bath, and can therefore be expected to last for the life of the pump.

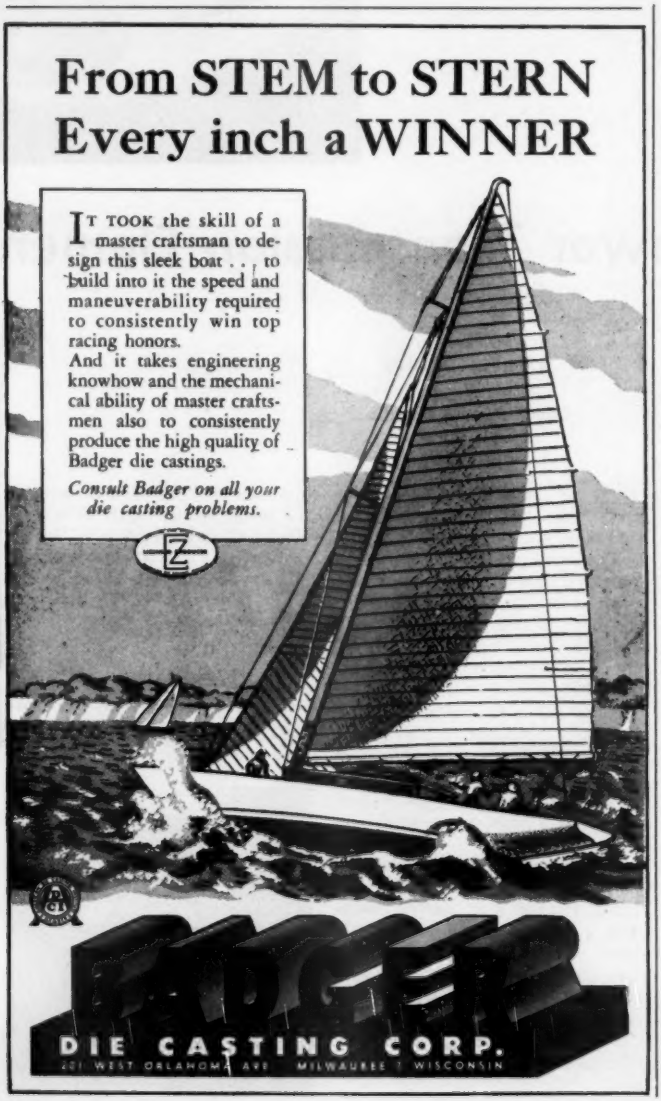
The pressure switch mounting pad is die cast of aluminum alloy. Aluminum was selected for this part because of its greater corrosion resistance when exposed to water.

Very little machining is necessary on these parts. Since they are for the most part functional parts, the flash is trimmed in a die and no attempt is made to polish the surface. On the motor pulley, a turning operation removes the flash, which otherwise might interfere with the tracking of the belt.

The crosshead is run through a sizing die by the die casting supplier. The wrist pin holes are reamed and the cored piston rod hole tapped by the company. The connecting rod comes from the supplier with both cap screw holes tapped, and the company has only to ream the shaft holes to remove core draft.

A facing operation is necessary on the end bearing cap to insure a proper seal, and a hole which carries oil to the bearing is drilled rather than cored because the difficult angle would make coring too expensive.

All of these parts have shown satisfactory performance in power transmission within the pump. The low cost of the finished die cast parts has helped the company to offer these pumps at prices lower than those usually associated with such equipment, yet still have products which give good performance and are durable.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## CHEMIST AND PLATER'S HELPER WIN ELECTROPLATING SCHOLARSHIPS

The Joseph B. Kushner Electroplating School of Stroudsburg, Pa., announces that two scholarships in "Electroplating Know How", a correspondence training course in modern electroplating technique, sponsored by the Fulton Asphalt Co., builders of plating room floors, have been won by Thomas J. Manns, plating chemist and engineer in charge of the Philco Corp. plating plant at Lansdale, Pa. and John F. Chisholm, dipper and plater's helper at the Watertown Arsenal, Watertown, Mass. Training for these two scholarship winners will begin at once.

The scholarship contest, which called for a fifty word statement beginning with the words "Electroplaters should be able to THINK plating as well as do plating because", resulted in a large volume of entries from all over the world. Entries were received from a complete spectrum of the plating industry, ranging from corporation presidents, executives, engineers and chemists to plating foremen, platers and helpers.

Those wishing to read statements made by the scholarship prize winners may do so by writing for free copies to the Joseph B. Kushner Electroplating School, Stroudsburg, 1C, Pa.

## AMERICAN WHEELABRATOR EXPANDS SALES DEPARTMENT

The American Wheelabrator & Equipment Corp., Mishawaka, Indiana has reorganized and expanded its sales staff at the executive level according to Otto A. Pfaff, president. The firm manufactures Wheelabrator blast cleaning equipment which is used to prepare the surface of die castings and other parts for coating, to remove burrs, and to eliminate porosity. They also manufacture air blast equipment, dust and fume collectors and other products for the foundry and metal working industries. Personnel changes and additions are as follows:

John A. Silver has been appointed director of sales. He was formerly with Lester and Silver, management and sales consultants of New York and Philadelphia.

E. B. Rich, Chicago representative of the Company, becomes general sales manager. L. L. Andrus, formerly vice president in charge of sales, is promoted to vice president and executive head of the Dust & Fume Division. A. E. Lenhard, advertising and sales promotion manager, assumes new responsibilities.

---

## COWLES ADDS SALES TERRITORY

The Cowles Chemical Company, Cleveland, Ohio, has announced that Robert H. Campbell was appointed Cowles technical man for the Metal Cleaner Department in its new sales territory comprising southern Illinois and St. Louis, Missouri.

Mr. Campbell attended the University of Illinois and Rockford College, specializing in chemistry. Following college he worked for a number of years at National Lock Co., first in the plating laboratory and then as assistant foreman on the plating line.

---

## ALCOA EXECUTIVE RETIRES

H. V. Churchill, chief of the Analytical Division of Aluminum Company of America's Research Laboratories in New Kensington retired from active service with the company on July 1. He has been succeeded by his son, J. R. Churchill, who has been his assistant since December, 1944.

An analytical chemist since 1914, Mr. H. V. Churchill has been affiliated with Alcoa since 1919, when he was made chief chemist in the technical direction bureau. In 1928 this department was absorbed by the research bureau and at that time he became head of the analytical chemistry division.

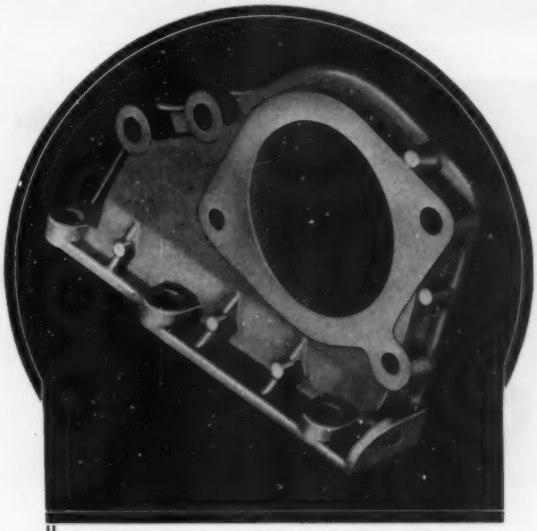
Some of Mr. Churchill's inventions and improvement of new products include: modification of aluminum-silicon alloys, ham boilers, inhibited shaving cream, fruit acid aluminum cleaner, removal of fluorine from water with activated alumina, and water softening.

## CRANE PACKING BEGINS NEW PLANT

Construction of new general offices and plant facilities for the Crane Packing Co., Chicago, is underway, according to a recent announcement by Frank E. Payne, president of the company.

A new plant, situated on Oakton Ave. in Morton Grove, Illinois, will cover 133,000 square feet of floor space when completed. The company manufactures industrial packings, mechanical and oil seals and a lapping machine.


"CLEVELAND" TRACTOR TIMING GEAR SIDE COVER



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QUOTATIONS ON BLUEPRINTS WILL BE PROMPT

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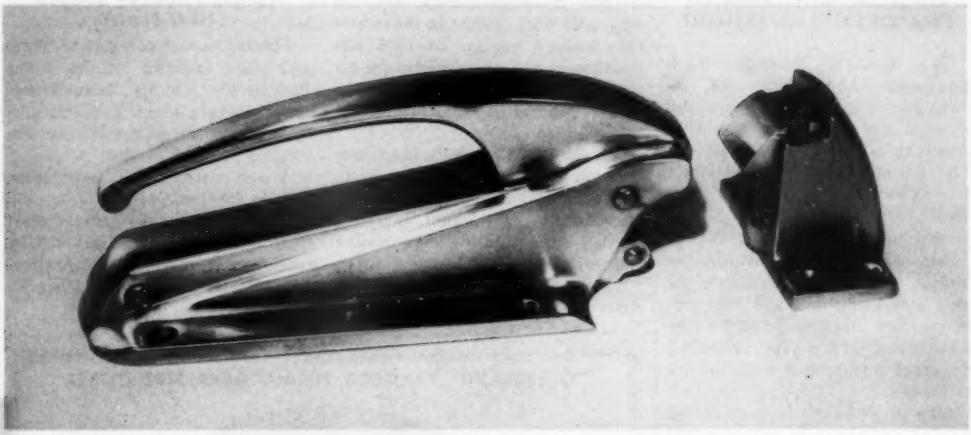
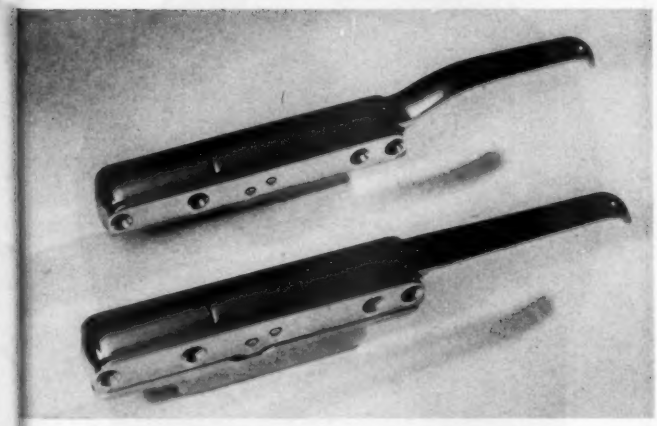




**1.** SMOOTHLY CONTOURED, this heavy-duty latch for walk-in refrigerators is sturdily constructed of die cast zinc, brass forgings, brass extrusions and cold rolled steel.

**2.** SAFETY is a big feature of all Kason hardware fittings, such as these flush-mount latches for reach-in refrigerators. These units, housed in die cast zinc, do not protrude into the store aisle.

# BUILT FOR DURABILITY

THE METALS used in constructing the Kason safety latch for walk-in refrigerators, Figure 1, have been chosen for their strength. As is well known, the doors on this type of refrigerator must, of necessity, be of heavy construction because the opening and closing actions place a severe load upon the hardware fittings.

Take a look, then, at the materials chosen by the Kason Hardware Corporation, Brooklyn, N. Y., to build their Model K-55 unit, identified by the trade name Safe Guard because it is impossible to lock a person accidentally or intentionally in a refrigerator which is equipped with this latch.

The latch has a forged brass handle weighing nearly three pounds mounted in a die cast zinc body with thick sections to withstand stresses. The tongue and striker are cut from brass extrusions, and again, the strike is housed in a sturdy zinc alloy die casting. The safety release lever located inside the refrigerator is formed

from cold rolled steel.

Naturally, cost factors and fabrication considerations have also entered the design calculations, but this heavily-built, positive-acting latch requires first and foremost, great strength and durability.

The use of zinc die castings is not new at Kason—for many years this company has enjoyed the economic advantage of die cast hardware components to reduce or eliminate secondary operations. These various housing and working parts have stood the critical test of prolonged service under actual field conditions.

### Army & Insurance Acceptance

Other evidence of the dependability of these latches housed in die cast zinc has been their acceptance by the U. S. Army Quartermaster Corps for use on sectional prefabricated warehouses.

Likewise, laboratories of the Associated Factory Mutual Fire Insurance Companies have approved oven door venting latches built by Kason for the bakery trade, and have included these units (housed in zinc die castings) in their 1950 manual of approved devices.

Also in current production is the Kason Edgemount latch, Figure 2, used extensively on reach-in refrigerators in self service grocery stores. This unit, including several die cast parts, is designed to be mounted flush with the case to eliminate the safety hazard of protruding parts.

In all of these parts intended for commercial refrigeration installations, appearance is an important consideration. As can be appreciated by examining Figures 1 and 2, Kason units have been designed with the smoothly blended contours and closely integrated form characteristic of modern design.

The finish applied to these latches has a functional, as well as an aesthetic value, because the protection of surfaces from the corrosive action of grease, fats, perspiration, humidity and salt is essential. These units are intended to maintain their bright, sanitary appearance over many years of hard daily usage.

A bright chrome plate over conventional copper and nickel underplates, similar to the treatment given exterior automotive hardware parts, results in a durable finish. There is no matching problem between the brass parts and those which are die cast because all can be uniformly chrome plated.

Due to the large size and complexity of many of these latch components, die casting costs are much lower than for comparable brass forgings. On a finished piece price basis, brass forgings often are more than fifty percent higher in cost than the die castings which have superceded them. This advantage, it has been pointed out, derives both from the lower piece cost and from a reduction in secondary processing.

Some conception of the size and structural features of the die cast latch housing can be obtained from Figure 3. Weight of this piece is about 4¼ pounds. Although the major stresses are applied to the forged brass handle, the pivot arms on the die cast housing also carry considerable load. This is accommodated by heavily reinforced wall sections. The natural bearing properties of the zinc alloy help to reduce wear upon the hinge pin holes where much of this load is concentrated. No bushings or sleeves are necessary to line the hinge pin holes.

From the die casting point of view, an interesting feature of the latch housing is a rectangular hole cored laterally through a boss on the underside. The undercut hole, while resulting in additional tooling costs, would be difficult to machine or broach due to its inaccessible position. Holes of this type, while not generally recommended for standard die casting practice, can often be justified for coring by the elimination of difficult or impossible machining operations.

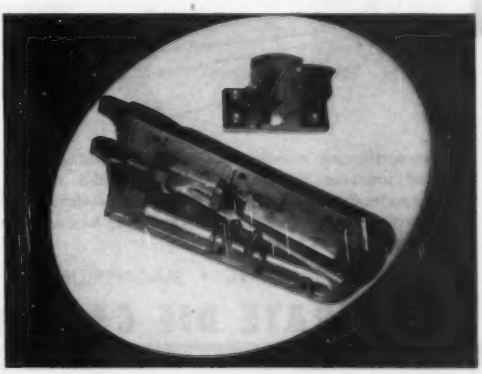
The housing for the striker has a unique design which permits adjustment of the strike in its socket. To provide the ways in which the strike moves, plus openings for the adjusting screw, intersecting slides in the die from four directions are required. However, the amount of machining which would be needed to hog this piece out of the solid or out of a forged blank, would be prohibitive for competitively priced hardware.

### Ready As Received

As die cast, this is virtually a finished piece as received, requiring only polishing and plating operations. No metal is wasted in chips and no time, labor or machine capacity are expended on machining.

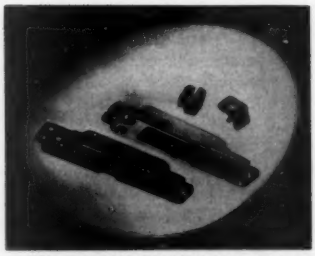
The adjustablity which is a feature of the large Safe Guard safety latch, is also a big sales point for other items in the Kason line. Thus, the Edgemount latch for reach-in refrigerators has a two-way adjustable strike; this includes a tension adjustment to take up sag of the door. These simple adjustments are easily

**3.** WEIGHING MORE THAN FOUR POUNDS, the housing for the latch is a solid chunk of die cast zinc alloy, reinforced to take stresses, and smooth-surfaced to take a bright plating job.



made, and are provided for by two small die cast pieces.

These adjusting blocks, shown in Figure 4, are simple in shape and relatively easy to die cast. Because of the excellent surface detail which can be obtained by die casting, four serrated surfaces are formed as an integral part of the strike assembly, without additional machining. This makes it possible to hold parallel relationships during adjustment, and gives a positive non-slip adjustment once the screws are tightened. This



4. BY CASTING SERRATED SURFACES on two small die cast blocks and inside the strike housing, this unit gets non-slip adjustability.

feature is easier and less expensive to provide by die casting than by any other commercial fabricating method.

The strike housing and inner components are received in a fully-formed condition, and need only the tapping of three small holes for adjusting screws.

For heavy duty commercial hardware, no sacrifice in quality can be made for penny-pinching; yet Kason engineers have found a way to save in costs without detracting from the functional effectiveness of their products — that way is to use die cast zinc for housings and some working parts where the strength of the material is sufficient to meet the requirements. In combination with wrought metals for stressed parts, a suitable combination of working properties and economy can be obtained.

---

## 57 STANDARDS APPROVED AT 1951 ASTM MEETING

Featured by 23 technical sessions at which were presented 110 technical papers covering various aspects of engineering materials, the 1951 Annual Meeting of the American Society for Testing Materials, held throughout the week of June 18 at Atlantic City, aiso included 615 meetings of the technical committees. The registered attendance—2277—is a new high compared with the 1950 figure of 2131.

Sixty-two of the Society's technical committees reported at the meeting, with the result that 57 new specifications and tests were approved and revisions in over 200 existing tentatives and standards were acted on. About 75 specifications and tests that have been published previously as tentative were approved for reference to Society letter ballot for adoption as standard. All of these new and revised specifications will be published later in the year in the 1951 Supplement to the Book of ASTM Standards.

Including the 1951 Annual Meeting actions there are now about 1775 ASTM standards. This compares with the figure twenty years ago of 625 and ten years ago, 1941, of about 1045. These figures indicate a definitely increased tempo in standardization activities during the last decade.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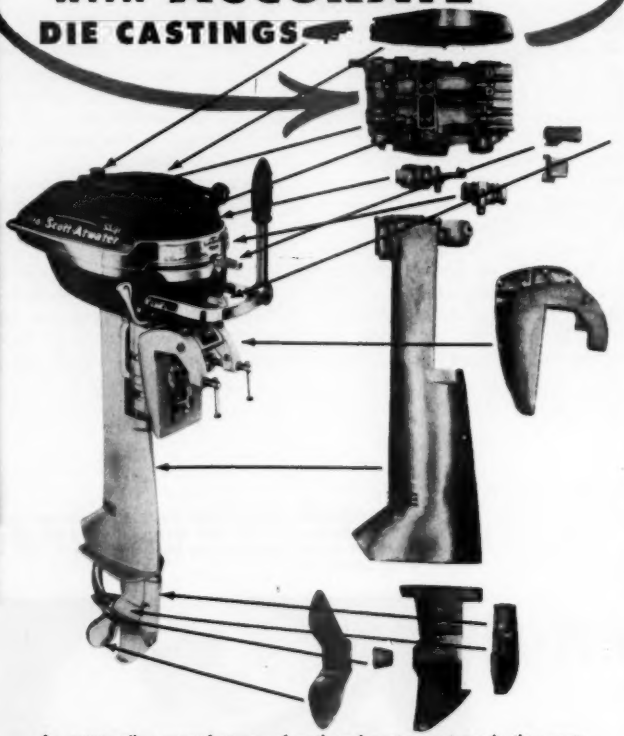


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# FINISHING DIE CASTINGS

## A SECTION DEVOTED TO THE FINISHING PROCESSES

MACHINING—Most die castings require some machining operations. In this section will be found information to aid in planning and selecting the proper method and equipment for these operations.

ASSEMBLING—Die castings are generally assembled components. This section includes information on fastenings and methods for mass production assembly operations.

SURFACE FINISHING—Most die castings receive some type of surface finish such as plating, organic coating, anodic coating or chemical coating. This section contains information on the methods, processes and equipment used for the various surface finishing treatments on the die casting alloys.

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# PRODUCTION CLINIC
## for finishing die castings

A monthly digest of current technical progress selected and prepared by the editorial staff of DIE CASTINGS. This section is devoted to finishing processes for all types of die castings, and is written specifically for the benefit of the production man.

## A SURVEY OF METHODS OF ASSEMBLING DIE CASTINGS

BECAUSE it is one of the final phases in the entire manufacturing operation, the method to be used for fastening individual components into subassemblies or of mounting subassemblies onto a main frame, is sometimes incompletely thought out.

One of the most neglected phases of product design has been the careful detailing of assembly features.

Thus, in one instance, a well-shaped handle for an appliance was designed only for appearance without sufficient attention to the method of attaching it. When it reached the production line, it was realized that screw holes were located at an inaccessible angle for the standard power screwdrivers, so that a special machine with offset driving bit had to be built for it at considerable extra expense.

In another case, two parts were designed in such a way that special screws were required rather than a standard type. The result was not only an expense almost double for the screws, but a delay of several weeks while special screws were being fitted into the screw manufacturer's production schedule.

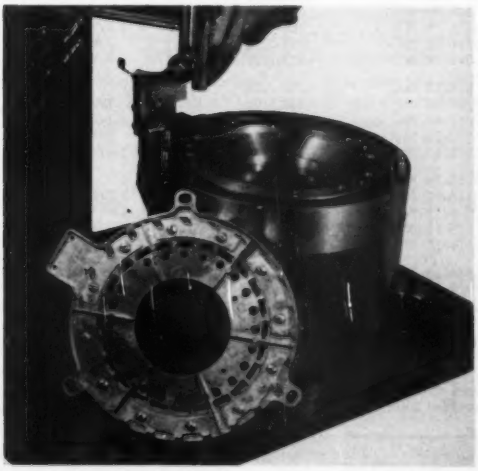
Not unusual is the failure of the designer to provide sufficient clearance for wrenches to be used in tightening nuts or bolts, or to allow enough extra stock for tapping threads, or to provide large enough pads or bosses for the required size of fastener.

In addition, there are many special fastening devices such as thread cutting screws, inserts or spring type nuts which could be used to advantage if the designer were fully familiar with fastening materials and equipment at his command.

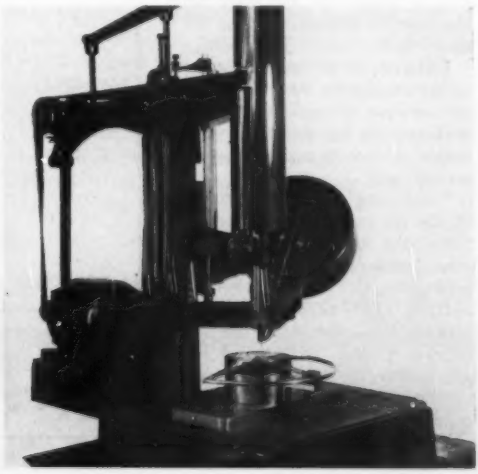
For this reason, a discussion of some methods, fasteners and equipment which are especially adapted for use on die cast components is presented here, in the hope that it may suggest to product designers some newer, faster, more economical ways of attaching die cast components or of overcoming production difficulties now being encountered.

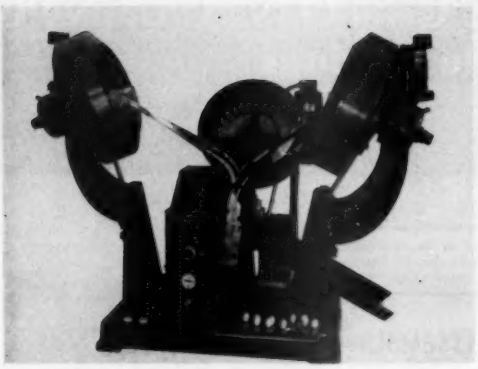
It is not possible here, in a brief article, to include detailed lists of standard sizes, threads or shapes of fasteners carried as stock items, so that designers are urged to consult with manufacturers of these fasteners at an early stage in product development, and to have at hand the catalog

COMBINING A 12-STATION radial indexing fixture with a hopper-fed power screwdriver, a series of screws are driven into this die cast juke box component. Photo courtesy Detroit Power Screwdriver Company.



TO DRIVE SCREWS AT A RATE OF 1 to 1½ seconds each, this bench model power screwdriver with automatic hopper feed can be used. Photo courtesy Detroit Power Screwdriver Company.





**TO ASSEMBLE WHEELS** on an axle for toy trains or autos, this type of unit can be utilized. Operator efficiency was increased from approximately 15 assemblies per minute to 75 per minute with automatic hopper feed. Photo courtesy Detroit Power Screwdriver Company.

listings which most manufacturers will readily furnish.

There are three special attributes of the die casting process which can be put to good use in planning a method of assembly. These are:

1. CORING. The ability to core a hole to accurate size and center location;
2. BOSSES. The ability to produce integral bosses, studs or pads within close limits as to size, shape and location; and
3. INSERTS. The ability to include inserts of other materials by positioning them in the die and casting molten metal around them.

In addition, certain properties of the die casting alloys will affect the choice of fasteners. The relative softness of the metal makes them especially easy to assemble with thread cutting screws. On the other hand, the inherent strength of these alloys makes them resistant to stripping.

Likewise, the strength of the metal makes possible the use of a relatively narrow boss or stud as a means of anchoring one part to another without danger of breaking or distorting under normal loads.

Considering each of the attributes of the die casting process as listed above, the following suggestions are offered to designers planning assembly methods.

*UTILIZING CORED HOLES:* It is common practice to core small holes to save drilling. Dimensional limits are usually considered to be 0.030 minimum diameter when die casting zinc or 3/32" in aluminum or magnesium. Except for very small diameter holes, it is possible to core to a depth approximately four times the diameter.

Holes can usually be cored to tapping size. Common taper allowances for core pull are small enough that they do not need to be removed by reaming before tapping. Table 1 contains dimensions recommended for cored tap holes in aluminum die castings.

Elimination of one machining operation by coring rather than drilling represents only half the possible economy in assembling die cast parts. A second machining operation can easily be eliminated by using tapping screws rather than tapping with a machine.

Where it is judged more practical to machine the thread, standard taps

For More Information On Fasteners See Page 23

can be used, although ground taps are sometimes preferable. This is one of the commonest machining operations on die castings, and is usually performed at high spindle speeds, with or without lubricant.

Due to the uniformity of castings and the accuracy of center location of multiple cored holes, it is often practical to substitute a multiple

**TABLE 1.**
**CORED TAP HOLE DIMENSIONS**

| Tap | | *Hole Diameters | Maximum Depth |
|---|---|---|---|
| .125 | 5-44 NF | .100-.104 | 5/16 |
| .125 | 5-40 NC | .097-.102 | 3/8 |
| .138 | 6-40 NF | .110-.115 | 3/8 |
| .138 | 6-32 NC | .107-.113 | 1/2 |
| .164 | 8-36 NF | .133-.139 | 1/2 |
| .164 | 8-32 NC | .129-.136 | 1/2 |
| .190 | 10-32 NF | .155-.162 | 1/2 |
| .190 | 10-24 NC | .149-.157 | 5/8 |
| .216 | 12-28 NF | .177-.184 | 1/2 |
| .216 | 12-24 NC | .170-.178 | 5/8 |
| | 1/4-28 NF | .211-.218 | 3/4 |
| | 1/4-20 NC | .195-.205 | 3/4 |
| | 5/16-24 NF | .266-.274 | 1-1/8 |
| | 5/16-18 NC | .251-.262 | 7/8 |
| | 3/8-24 NF | .329-.337 | 5/8 |
| | 3/8-16 NC | .306-.318 | 1 |
| | 7/16-20 NF | .382-.392 | 7/8 |
| | 7/16-14 NC | .358-.372 | 1-1/8 |
| | 1/2-20 NF | .445-.455 | 7/8 |
| | 1/2-13 NC | .415-.430 | 1-1/4 |
| | 9/16-18 NF | .501-.512 | 1 |
| | 9/16-12 NC | .470-.486 | 1-3/8 |
| | 5/8-18 NF | .563-.574 | 1 |
| | 5/8-11 NC | .525-.542 | 1-3/8 |
| | 3/4-16 NF | .681-.693 | 1 |
| | 3/4-10 NC | .640-.659 | 1-1/2 |
| | 7/8-14 NF | .796-.810 | 1-1/8 |
| | 7/8-9 NC | .752-.774 | 1-3/4 |
| | 1-14 NF | .921-.935 | 1-1/8 |
| | 1-8 NC | .862-.886 | 2 |

*Nominal diameters at small and large ends of hole. These dimensions are subject to the standard tolerance of ± .002 inch.

*Reprinted from "Designing for Alcoa Die Castings" published by the Aluminum Company of America.*

ACTUAL UNRETOUCHED PHOTOGRAPH

## A CASE HISTORY FROM THE STEVENS EXPERIMENTAL POLISHING AND BUFFING LABORATORY

Here is a step-by-step example of how Stevens' customer-service works in actual operation. The customer in this case was a plumbing fixture manufacturer who asked the Stevens experimental polishing and buffing laboratory to develop the most efficient methods and recommend the correct compositions for giving a high luster to chrome-plated brass bath fittings. These were the findings:

**POLISHING:** The brass rough casting ❶ was put through three polishing operations—ROUGHING with No. 80 Artificial Abrasive on a 16-inch wheel at 1900 r.p.m., dry; FINING with No. 120 Artificial Abrasive on a slightly softer wheel, also dry, and OILING with No. 180 Natural Emery on a ⅝" spiral sewed 14-inch canvas polishing wheel (medium hard) at 1900 r.p.m., lubricated with Stevens No. 2 Tallow Stick.

**BUFFING:** The polished casting ❷ was then buffed with Stevens No. 47 Tripoli on a Stevens radial sewed, 16-pocket, 86/93 count buff 14 inches in diameter at 2100 r.p.m. The casting ❸ was then ready for electroplating.

**COLORING:** Following the electroplating process the casting was buffed with Stevens No. 101 Chrome Composition on a Stevens 64/64 folded buff, 14 inches in diameter at 2100 r.p.m. The resultant beauty and high luster is apparent in ❹

This is a typical case where Stevens' technical and research facilities were able to bring to a customer the exact, tailored polishing and buffing techniques for his specific operations. We will be glad to do the same for you. Just call your Stevens representative or write direct to *Frederic B. Stevens, Inc., Detroit 16, Michigan,* for full details on how to avail yourself of Stevens' customer-service for polishing and buffing problems. There's no obligation.

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spindle machine for a single spindle tapper.

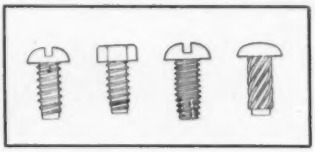
However, as has been pointed out, in many instances, a tapping screw will save time and labor. These screws, made of hardened tool steel, are designed to cut or roll their own threads. Some of the advantages of this type of screw may be listed as: 1) greater strength of hardened tapping screw so that fewer or smaller screws can be used, 2) higher loosening torque due to snug fit of screw, 3) elimination of separate tapping operation, 4) reduced danger of overdriving screw when using high production power drivers.*

Tapping screws can be removed and redriven into the same hole many times, without appreciable loss of holding power.

Tapping screws are available with different types of heads, slotted, hex head or Phillips head. Some of these screws are furnished with a slotted shank to serve as a cutter, others having a double lead at the tapered pilot roll or form the threads by compressing the material inside the hole. A third type of screw which needs no tapping prior to insertion is known as a drive screw which has a steep spiral thread which is driven or pressed in for a permanent fastening.

Another way in which a cored hole can be utilized for assembling is to press in a tubular spring fastener. A stud on the mating part then is slipped into the hole, so that the spring fastener grips both the inside surface of the hole and the outside diameter of the stud to effect a permanent assembly.

The number of screws to be used can sometimes be reduced by design-



FOUR TYPES OF SELF-TAPPING SCREWS especially suited for use on die cast alloys are, *left* to *right*: 1) Type Z which rolls threads into the materials as it is driven, 2) Hex head Z, similar to first example except that it has a hex head instead of slotted head, 3) Type F which has a tap-fluted pilot to cut a thread as it is turned, 4) Type U hardened drive screw with steep spiral thread for permanent assembly. Courtesy Parker-Kalon Corporation.

ing mating holes and studs in pieces to be assembled. Then, a single screw can be used to fasten the two parts together, while the mating holes and bosses serve to prevent any radial or lateral movement of the assembly. This, of course, can only be attempted when there is little load or stress on the fastening, or where the fastener is just intended to hold two pieces in juxtaposition without any functional relationship.

*UTILIZING BOSSES AND STUDS:* A special group of spring type fasteners called Speed Nuts, used in conjunction with integrally formed bosses or studs, provide an especially rapid and economical method of assembling.

Where two parts are to be assembled, bosses in one component can mate with through holes in the other, and these spring type fasteners can be pressed over the bosses to complete the assembly with mach-

* For a review of tests on driving torque, stripping strengths, loosening torque and other data concerning thread cutting screws, see *Thread Cutting Screws in Die Castings* in the February 1947 issue of Die Castings.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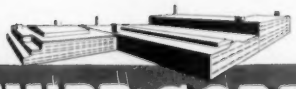

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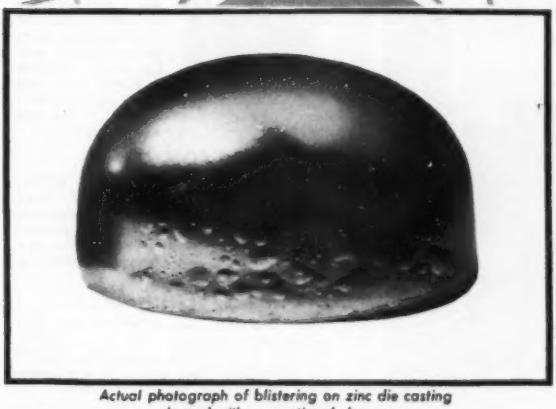
# STOP BLISTERING, STREAKING

## ON ZINC BASE DIE CASTINGS!



*Actual photograph of blistering on zinc die casting cleaned with conventional cleaner.*

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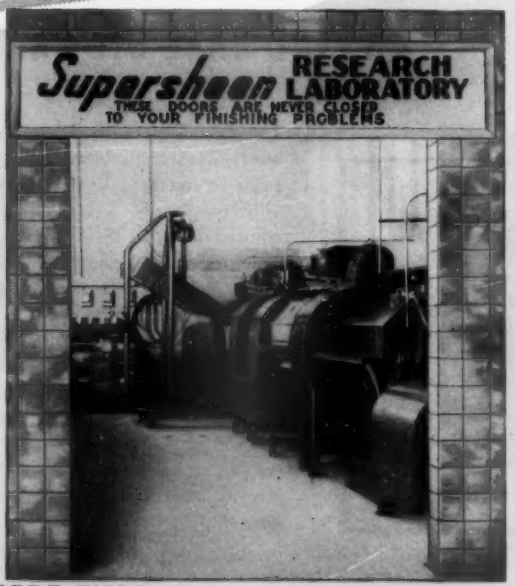


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**AMERICA'S LARGEST MANUFACTURER OF ADVANCED BARREL FINISHING EQUIPMENT—MATERIALS AND COMPOUNDS**
**ALBERT LEA, MINNESOTA**

## ALMCO SUPERSHEEN LEADS IN BARREL FINISHING ADVANCES

In the last three years startling advances in barrel finishing equipment and techniques have come from the Almco Research Program. Truly ADVANCED equipment has been developed — new super-efficient abrasive media and compounds have been discovered. ONLY ABOUT 30% OF INDUSTRY IS NOW BENEFITING FROM THE TREMENDOUS COST SAVINGS MADE POSSIBLE BY THESE NEW DEVELOPMENTS.

### NEW EQUIPMENT

The present line of Almco Supersheen equipment is the most advanced and most complete on the market today! Barrel sizes range from 8" x 16" to 30" x 60". Many different types are now available for finishing parts heretofore finished only by hand. Handling equipment has been improved for speedier loading, unloading and separating.

### NEW COMPOUNDS

The new Supersheen compounds are without parallel in the barrel finishing field. These new compounds have played an important part in attaining finer finishes, faster processing. Almco has chosen to develop its own barrel finishing compounds to insure "a better finish faster".

### NEW TECHNIQUES

Almco engineers have developed new procedures that broadened the scope of barrel finishing to an almost unbelievable degree. The Almco Supersheen process is now being used by manufacturers in all fields for a multitude of finishing operations — deburring, grinding, cutting down, cleaning, forming uniform micro-exact radii, reducing surface porosity, finishing intricate parts, removing paint, coloring, burnishing, etc. No other techniques, producing comparable results, can operate with such low total paid labor time, moderate requirements of skill, and maintain practically any required production volume.

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This inside story of Advanced Barrel Finishing. 20 pages of facts and figures. Write for Booklet No. D-8.

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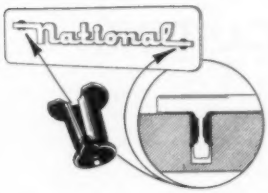
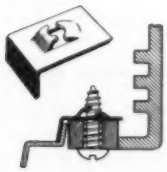
ining, fixtures, special tools or secondary processing of any kind.

Speed Nuts are available in a large number of standard types. They are made of spring steel, stainless steel or phosphor bronze, and replace threaded nuts and lock washers when used with screws or threaded bosses; when used with die castings, it is us-




**TWO TUBULAR TYPE SPEED CLIPS** attach this die cast name plate which has cast studs to fit into cored holes. The clips develop a compression "bite" on the studs that assures permanently tight attachment.



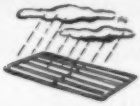
**SPECIAL TYPE SPEED NUT** is used here to attach a die cast auto instrument panel grille to the dash panel. The turned-down end of the nut extends over the edge of the opening in the dash to lock the grille firmly in place.

**REMOVABLE TYPE OF PUSH-ON SPEED NUT** is this one which fits over a die cast D-shaped stud on a grille for a kitchen range. Drawings courtesy Tinnerman Products, Inc.

ually possible to eliminate any threading of the stud, since the spring tension of the clip grips the die casting firmly.

The large number of types could not be listed here, each intended for a special type of fastening problem; however, a few include the flat push-on type which is probably most common, tubular push-in type, twin type for making two fastenings at a time

*(Continued on Page 58)*

whether your product
must be finished for
corrosion resistance  or
paint adherence, or with
eye-appealing brightness
or in a variety of attractive
colors, ... there's an
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Let the experience of our field engineers and laboratory specialists be your guide to the solution of your specific finishing problem.

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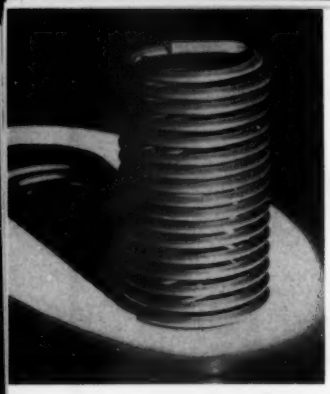


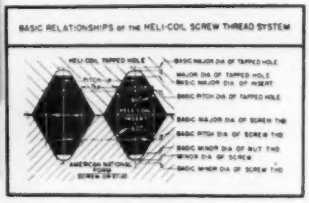
# HELICAL INSERTS PROTECT THREADS IN DIE CASTING

**HELICALLY-WOUND COILS of diamond-shaped stainless steel wire protect tapped threads in die cast metals against stripping, seizing, galling, cross-threading and abrasive wear.**

STAINLESS STEEL helical-wire thread inserts provide threads in aluminum, magnesium and zinc die cast components that can withstand higher loads and have greater resistance to wear, corrosion, and vibration than threads tapped directly into these relatively soft materials.

These thread inserts, manufactured by the Heli-Coil Corporation of Long Island City, New York, are precision-wound coils of 18-8 stainless steel wire having diamond-shaped cross-sections that conform to the American National Series of thread contours, see Figure 1. They are also available in spark plug and pipe thread sizes.

The National Series of thread inserts range in size from 4-40 to 1-1/2-12 NF, 6-40 to 1-1/2-6 NC and are standard in 1, 1-1/2, and 2-diameter lengths. Longer and special lengths are also available. Installation with hand or power tools is a fast and simple operation.


BASIC RELATIONSHIPS of the HELI-COIL SCREW THREAD SYSTEM
HELI-COIL TAPPED HOLE
PITCH
BASIC MAJOR DIA OF TAPPED HOLE
MAJOR DIA OF TAPPED HOLE
BASIC MAJOR DIA OF INSERT
BASIC PITCH DIA OF TAPPED HOLE
BASIC MAJOR DIA OF SCREW THD
BASIC PITCH DIA OF SCREW THD
BASIC MINOR DIA OF NUT THD
MINOR DIA OF SCREW
AMERICAN NATIONAL FORM SCREW CONTOUR
BASIC MINOR DIA OF SCREW THD

**1.** CROSS-SECTION VIEW shows how helical-wire thread inserts conform to American National thread contours.

### Advantages Analyzed

From the economic point-of-view, the cost of the smaller sizes of helical-wire thread inserts is slightly higher than that of solid brass and steel inserts. As insert sizes increase, costs become equal to and then less than solid inserts. However, the cost can be considered negligible in comparison with the advantages gained:

1. Tapped holes lined with Heli-Coil thread inserts can withstand substantially higher loads than conventionally-tapped holes because the spring-like inserts *provide thread en-*

TABLE 1 ←

American National Fine Thread Series Specifications

| SIZE | INSERT: FREE RUNNING DIA. | INSERT: FREE NO. OF COILS — To Thread Run Down | INSERT: FREE LENGTH DIA. | DRILLED HOLE: Minimum Dia. Full Depth Drill Size Max. Tensile 125,000 p.s.i. | DRILLED HOLE: Minimum Dia. Full Depth Drill Size Max. Tensile 90,000 p.s.i. | TAPPED HOLE: Minimum Dia. | TAPPED HOLE: Pitch Dia. | ASSEMBLED INSERT: Minimum Dia. | ASSEMBLED INSERT: Pitch Dia. | ASSEMBLED INSERT: Major Dia. |
|---|---|---|---|---|---|---|---|---|---|---|
| | Max. | No. | Min. | Max. | Max. | Max. | Max. | Min. | Max. | Max. |
| #10-32 | .156 | .156 | 4½ | .096 | .096 | .1495 | .1496 | .1553 | .1615 | .1705 |
| #12-28 | .170 | .170 | 5 | .104 | .104 | .1637 | .1640 | .1697 | .1764 | .1860 |
| #1/4-28 | .1898 | .1898 | 5½ | .1234 | .1230 | .1912 | .1915 | .1957 | .2024 | .2120 |
| #5/16-24 | .2445 | .2445 | 6½ | .1619 | .1614 | .2524 | .2527 | .2583 | .2663 | .2780 |
| #3/8-24 | .3070 | .3070 | 8 | .2244 | .2238 | .3149 | .3152 | .3208 | .3288 | .3405 |
| #7/16-20 | .3477 | .3477 | 8½ | .2559 | .2552 | .3577 | .3581 | .3644 | .3737 | .3870 |
| #1/2-20 | .4102 | .4102 | 9½ | .3184 | .3177 | .4202 | .4206 | .4269 | .4362 | .4495 |
| #9/16-18 | .4727 | .4727 | 10½ | .3809 | .3802 | .4827 | .4831 | .4894 | .4987 | .5120 |
| #5/8-18 | .5351 | .5351 | 11½ | .4434 | .4427 | .5452 | .5456 | .5519 | .5612 | .5745 |
| #3/4-16 | .6602 | .6602 | 13½ | .5684 | .5676 | .6703 | .6707 | .6770 | .6865 | .7000 |
| #7/8-14 | .7851 | .7851 | 15½ | .6933 | .6925 | .7949 | .7953 | .8017 | .8117 | .8260 |
| #1-14 | .9101 | .9101 | 17½ | .8183 | .8175 | .9199 | .9203 | .9267 | .9367 | .9510 |
| #1-1/8-12 | 1.0348 | 1.0348 | 19½ | .9429 | .9420 | 1.0454 | 1.0459 | 1.0527 | 1.0632 | 1.0785 |
| #1-1/4-12 | 1.1598 | 1.1598 | 21½ | 1.0679 | 1.0670 | 1.1704 | 1.1709 | 1.1777 | 1.1882 | 1.2035 |
| #1-3/8-12 | 1.2848 | 1.2848 | 23½ | 1.1929 | 1.1920 | 1.2954 | 1.2959 | 1.3027 | 1.3132 | 1.3285 |
| #1-1/2-12 | 1.4098 | 1.4098 | 25½ | 1.3179 | 1.3170 | 1.4204 | 1.4209 | 1.4277 | 1.4382 | 1.4535 |

TABLE 2 →

American National Coarse Thread Series Specifications

| SIZE | INSERT: FREE RUNNING DIA. | INSERT: FREE NO. OF COILS — To Thread Run Down | INSERT: FREE LENGTH DIA. | DRILLED HOLE: Minimum Dia. Full Depth Drill Size Max. Tensile 125,000 p.s.i. | DRILLED HOLE: Minimum Dia. Full Depth Drill Size Max. Tensile 90,000 p.s.i. | TAPPED HOLE: Minimum Dia. | TAPPED HOLE: Pitch Dia. | ASSEMBLED INSERT: Minimum Dia. | ASSEMBLED INSERT: Pitch Dia. | ASSEMBLED INSERT: Major Dia. |
|---|---|---|---|---|---|---|---|---|---|---|
| | Max. | No. | Min. | Max. | Max. | Max. | Max. | Min. | Max. | Max. |
| #6-32 | .1492 | .1496 | 3½ | .096 | .096 | .1389 | .1393 | .1440 | .1482 | .1542 |
| #8-32 | .1745 | .1750 | 4 | .1177 | .1170 | .1702 | .1706 | .1763 | .1825 | .1885 |
| #10-24 | .2007 | .2012 | 4½ | .1373 | .1366 | .1967 | .1971 | .2030 | .2092 | .2152 |
| #12-24 | .2632 | .2638 | 5½ | .1998 | .1991 | .2597 | .2601 | .2660 | .2722 | .2782 |
| #1/4-20 | .3209 | .3215 | 6½ | .2476 | .2468 | .3209 | .3213 | .3280 | .3344 | .3410 |
| #5/16-18 | .4042 | .4048 | 8 | .3209 | .3202 | .4167 | .4171 | .4241 | .4305 | .4374 |
| #3/8-16 | .4866 | .4872 | 9½ | .3917 | .3908 | .5086 | .5090 | .5164 | .5228 | .5299 |
| #7/16-14 | .5689 | .5696 | 11½ | .4624 | .4615 | .6004 | .6008 | .6086 | .6150 | .6223 |
| #1/2-13 | .6505 | .6513 | 13½ | .5335 | .5326 | .6924 | .6928 | .7008 | .7073 | .7147 |
| #9/16-12 | .7326 | .7334 | 15½ | .6041 | .6032 | .7844 | .7848 | .7933 | .7998 | .8071 |
| #5/8-11 | .8134 | .8142 | 17½ | .6744 | .6734 | .8753 | .8757 | .8852 | .8917 | .8990 |
| #3/4-10 | .9759 | .9768 | 21½ | .8148 | .8138 | 1.0562 | 1.0566 | 1.0672 | 1.0736 | 1.0809 |
| #7/8-9 | 1.1381 | 1.1391 | 25½ | .9552 | .9542 | 1.2371 | 1.2375 | 1.2491 | 1.2554 | 1.2627 |
| #1-8 | 1.3004 | 1.3015 | 29½ | 1.0955 | 1.0944 | 1.4180 | 1.4184 | 1.4310 | 1.4373 | 1.4446 |
| #1-1/8-7 | 1.4627 | 1.4639 | 33½ | 1.2359 | 1.2347 | 1.6000 | 1.6004 | 1.6140 | 1.6203 | 1.6276 |
| #1-1/4-7 | 1.6251 | 1.6263 | 37½ | 1.3763 | 1.3751 | 1.7824 | 1.7828 | 1.7964 | 1.8027 | 1.8100 |
| #1-3/8-6 | 1.7875 | 1.7887 | 41½ | 1.5167 | 1.5154 | 1.9648 | 1.9652 | 1.9790 | 1.9853 | 1.9926 |
| #1-1/2-6 | 1.9499 | 1.9511 | 45½ | 1.6571 | 1.6558 | 2.1472 | 2.1476 | 2.1614 | 2.1677 | 2.1750 |

**2.** AS ORIGINAL MANUFACTURING COMPONENTS in the three housing assembly bolt holes of the Ingersoll-Rand rotary electric Impactool, Heli-Coil inserts provide threads in this die cast aluminum housing than can withstand higher loads and have greater resistance to wear than unprotected tapped threads in the same material.

**3.** DRILLING CAP SCREW HOLES in the aluminum die cast hammer case of Ingersoll-Rand Size 4U universal electric Impactool. The drill jig at the top is used to locate the three holes. The jig at the bottom is used to support the housing so that the holes will be parallel to the axis.

*gagements of 90 percent and better,* and thus evenly distribute the load over more threads.

2. Insert lined holes are virtually *free from wear* caused by vibration or frequent assembly and disassembly. In addition, possibilities of cross-threading, seizing, and galling are practically eliminated.

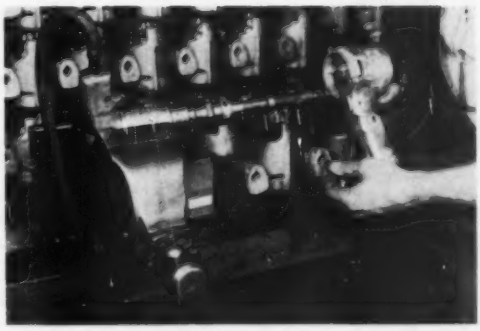
3. Because of their smaller diameters, wire inserts take up less space than solid inserts. For this reason, their use in die castings permits a more compact and streamlined design.

4. The physical properties of the stainless steel used in the manufacture of these inserts are such that, in comparison with the light metals, *wear from abrasion is virtually eliminated.* Also, this material, a steel alloy containing nickel and chromium, is highly resistant to most types of corrosion.

**4.** A SMALL TAP ATTACHMENT on a single spindle drill press is used for tapping hammer case cap screw holes in the housing of the Impactool.

### Method of Insertion

Helical-wire thread inserts are manufactured to diameters slightly larger than those into which they will be inserted. The tool used in the in-



**5.** INSERTING THE "HELI-COIL" into one of the tapped holes in an Ingersoll-Rand Size 4U Impactool housing. A "Heli-Coil" is installed in each of the three holes. The inserting attachment is driven by an Ingersoll-Rand Size ON Air Drill, clamped in a vise. In performing this operation, the housing is held in one hand, leaving the other free to hold a supply of "Heli-Coils" for rapid insertion in the loading slot of the inserting attachment. By means of a throttling valve in the hose line (not shown in the photograph), the operator is able to regulate the speed somewhat to get the most suitable speed for setting the inserts. When the insert is driven to proper depths, the attachment shown kicks out automatically.

# IS THREAD STRIPPING YOUR PROBLEM?

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Installation is easy and rapid. A simple driving tool turns the insert into a cored or drilled hole equal in size to a tap drill hole for the external thread of the insert. It taps its own thread with the cutting edges of its slotted segments. The insert remains rigidly in place because the torque to dislodge it is greater than the torque a standard machine screw can withstand.

U. S. Patent 2,455,805

The Tap-Lok Insert eliminates the uncertainties, losses and weaknesses of molded-in and cast-in inserts — improves the product at lower costs.

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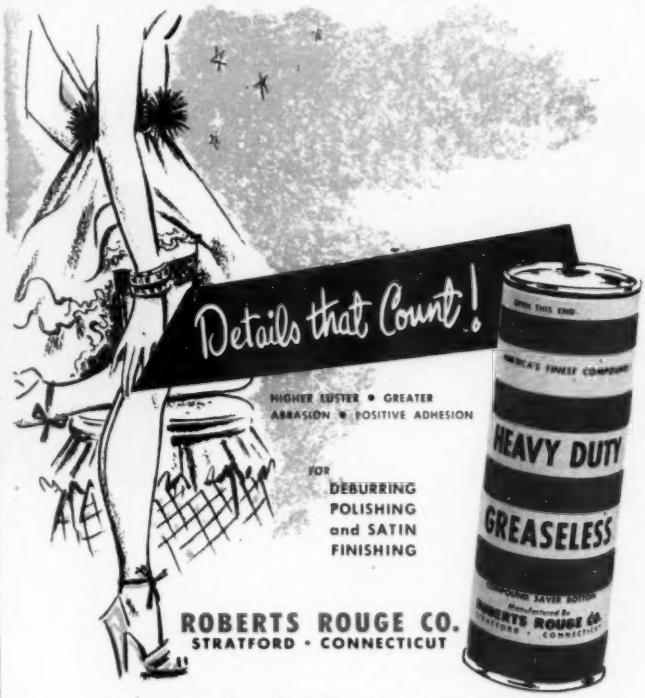
stallation operation is a prewinding device that reduces the outside diameter of the coils to slightly less than the tapped receiving hole before the insert is turned into the hole.

Once in place in the hole, the insert expands against the female receiving threads and automatically locks itself in the hole. No amount of vibration or turning will dislodge the insert. If desired, it can be removed by hand with another tool.

When properly assembled in tapped holes, the inserts conform with standard specifications for screw threads as published by the National Bureau of Standards. Both the American National Fine and Coarse Thread Series of helical-wire thread inserts meet class 3 fit requirements, see Tables I and II.

Current die casting uses of helical-wire thread inserts include such parts as electric tool housings, carburetors, radar components, aircraft accessories, transmission housings, gear cases, camera housings, jet engine atomizer nozzles, and fuel pumps.

*(Continued on Page 62)*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# USEFUL LITERATURE

**For additional information on the products appearing on this and the following pages, mark the key number of the item on the card bound into this issue. Drop the card in the mail—no postage is required.**

### 170 IMPROVES MACHINING ACCURACY:

Positioning parts for machining by the optical method is the subject covered in a 12-page booklet offered by the F. T. Griswold Mfg. Co. The effects of backlash, oil films or mechanical wear are eliminated, since alignment is done with an optical system.

### 171 COATINGS FOR ALUMINUM, ZINC:

The entire line of Iridite finishes are shown in chart form in terms of the effects produced on aluminum, zinc and copper alloys in a bulletin offered by Allied Research Products, Inc. Also described are the company's ARP brighteners for zinc and cadmium plating.

### 172 PHOSPHATE COATING FOR ZINC:

Lithoform is a coating that can be applied to zinc-base die castings to form a zinc phosphate coating that prevents corrosion and helps bond paint to the base metal. It is described in literature available from the American Chemical Paint Co., together with equipment for applying.

### 173 IMPREGNATION OF CASTINGS:

Armetol, a styrene-linseed copolymer, can be used to impregnate aluminum and magnesium die castings, according to a bulletin published by the Foundry Products Div., Archer-Daniels-Midland Co. It is non-electrolytic, is not broken down by internal stressing of the casting, can be applied at low temperatures and does not interfere with subsequent machining.

### 174 HELP ON DO SPRAY FINISHING:

A five-point program for setting up a spray finishing production line for DO work is covered in a pamphlet offered by the Binks Mfg. Co. The booklet shows equipment designed for specific problems in finishing military equipment.

### 175 BURRING CLOSE-TOLERANCE PARTS:

The Lea method of burring is recommended by the manufacturer for work on close tolerance parts. The reason given is that the Lea method uses cloth or other soft material wheels or bobs, rather than hard burring tools or emery wheels. The bulletin offered by the Lea Mfg. Co. claims that the softer materials make it easier for the operator to stay within tolerances.

### 176 ABRASIVE OR BURNISHING COMPOUND:

Cocob, a ground and milled corn cob product, is described in literature available from the Agri-Indus Mfg. Co. It can be had in standard or specified mesh sizes, and can be used for abrasive cleaning, barrel burnishing and coloring, for drying and other barrel finishing operations.

### 16. BARREL FINISHING COMPOUNDS:

Barrel finishing with Honite compounds is described in a booklet offered by the Minnesota Mining & Mfg. Co. The booklet explains the advantages of barrel finishing and gives applications for the various Honite products.

### 178 CHECK ON MACHINE EFFICIENCY:

A line of running time recorders to keep charts on the running time and down-time of machines is described in Bulletin OP1504, available from the Bristol Co. There are wall-mounted and portable recorders in the line.

### 179 COLORED PROTECTIVE COATINGS:

A chromate coating for zinc die castings which can be dyed black, red and other colors is described in literature offered by Enthone, Inc. The coating, called Enthox, is applied by immersion at room temperature.

### 180 USING CUTTING FLUIDS:

"The Application of Cutting Fluids to Machining Operations" is the title of an article appearing in the Report, published by the Cincinnati Milling Machine Co.

### 181 CONTROLLING BRASS FOR DIE CASTING:

A booklet showing the Quantometer and other equipment used for controlling the alloys which are die cast or fabricated by other methods by the Titan Metal Mfg. Co. is offered by the company. Titan makes brass die castings and other brass and bronze products.

### 182 HIGH SPEED PHOSPHATE COATING:

A phosphate coating called Keykote which can be applied in one to two minutes from black iron tanks is described in literature available from Kelite Products, Inc.

### 183 INCREASING MACHINE PRODUCTIVITY:

A plan-book explaining the CCC plan for coordinated tool control is offered to management men by the Carboloy Dept., General Electric Co. The plan is intended to help management standardize on tools and tool use procedures.

*(Continued on Page 48)*

# A NEW WAY *to finish inside diameters*

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In manually controlled models (BM Series) the directional valve is operated by a lever adjustable to work from practically any angle in any plane. It may be operated by hand, linked to a foot pedal, or mechanically synchronized to a moving machine element.

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**Write for New Bulletin** — *Complete descriptions of Bellows Air Motors and other Bellows "Controlled-Air-Power" Devices: technical data, wiring diagrams, dimensions, application detail, etc. Ask for Bulletin CL-30. Address: The Bellows Co., Dept. DC 851, 222 West Market Street, Akron 9, Ohio.*

1207

**HYDRAULIC CHECKING OF AIR POWER**

The Bellows Hydro-Check removes the natural "bounce" and "springiness" from air—gives the smoothness of hydraulic operation to air-powered equipment—but keeps the speed, flexibility and economy of air-operation. The Hydro-Check is available for use with all Bellows "Controlled-Air-Power" Devices or may be installed to regulate and control the piston movement of standard Air Cylinders.

**The Bellows Co.**
AKRON 9, OHIO
FIELD ENGINEER OFFICES IN ALL PRINCIPAL CITIES

*Circle No. 14 on Reader Service Card for more information.*


## USEFUL LITERATURE

*(Continued from Page 46)*

### 184 MELTING AND HEAT TREATING EQUIPMENT:

Crucible melting furnaces for non-ferrous metals and other heat-treating equipment are described in literature offered by the Mahr Mfg. Co.

### 185 GRINDING CARBIDE TOOLS:

XL bonded silicon carbide wheels made especially for grinding carbide tools are described in a four-page folder put out by the Chicago Wheel & Mfg. Co.

### 186 PYROMETERS FOR DIE CAST METALS:

Two portable pyrometers for checking the temperatures of molten zinc, aluminum, lead, tin, brass and other nonferrous alloys are covered in Bulletin PPY-1, offered by the Wheelco Instruments Co.

### 187 HIGH TEMPERATURE LUBRICANTS:

Standard high temperature lubricants made by the Bel-Ray Co. are described in Bulletin No. 85, available from the company. Bel-Ray also develops lubricants for special high temperature applications.

### 188 GRINDERS AND ARBORS:

Ball bearing bench grinders, arbors, sanding disks and face plates are shown in an illustrated catalog issued by Poly Products. Specifications and dimensional diagrams are included.

### 189 SPECIALLY-DESIGNED REAMERS HOLD +.0002 —.0000 LIMITS:

New designs and manufacturing methods have enabled Woodruff & Stokes Co., Hingham, Mass., to produce a line of small reamers capable of holding tolerances of .0002—.0000 or closer, according to literature available from the company. The ground and honed reamers are supplied in three types: flat, half-round and fluted (spiral or straight).

### 190 SURVEY OF HEAT PROCESSING EQUIPMENT:

Radiant gas heat processing equipment for melting, selective hardening, brazing, normalizing and other operations is described and illustrated in a new bulletin, "Precision Tools for Production" available from Selas Corporation of America.

## PLATING OF DIE CASTINGS TAKES IMPORTANT SPOT AT AES ANNUAL MEETING

The electroplating of zinc alloy die castings occupies an important position on the schedule of the 38th annual meeting of the American Electroplaters' Society, July 29-August 2, 1951 in Buffalo, N.Y.

Five major papers in the Tuesday morning sessions cover various phases of this subject. This session, devoted to "Preparation and Plating of Zinc Base Die-Castings," is under the chairmanship of Dr. R. B. Saltonstall of The Udylite Corporation.

Papers presented include the following: "Requirements of Die Castings for Plating" by Glenwood J. Beckwith, Metallon Products, Inc., Los Angeles, Cal. This paper touches on the design of parts, dies, surface quality, alloy composition.

M. R. Caldwell of the Doehler-Jarvis Corporation plant in Grand Rapids, Mich., analyzes problems relating to polishing, buffing, surface condition, types of equipment, etc. in his paper, "Mechanical Finishing of Die Castings."

Following, is a summary of preliminary steps in plating, in a paper, "Chemical and Electrochemical Preparation of Die Castings for Plating" by Earl W. Arnold of L. H. Butcher Co., Los Angeles. Final paper of the series is one by Chester G. Borlet of United Chromium, Inc., Detroit, Mich., titled, "Electroplating Zinc Base Die Castings." This paper touches on the factors affecting deposition, specifications, bath compositions, current density, filtration and other plating conditions.

In another important session, substitute finishes are being discussed, with papers delivered by Alfred Douty of American Chemical Paint Co., Charles W. Ostrander, Allied Research Products, Inc.; Dr. Walter Meyer, Enthone, Inc.; Donald R. Meserve, United Chromium, Inc.; A. W. Ackerman, F. E. Anderson Oil Co.

Under the chairmanship of Dr. Meyer, subjects presented as short introductory talks include phosphate coatings, chromate treatments, black oxide coatings, clear and pigmented organic coatings and rust preventive oils and waxes.

BARREL FINISHING NEWS

# "Super Honite" chips last twice as long!

Now you can speed your barrel finishing with the world's toughest abrasive chip—"Super Honite!" It's the hardest chip ever produced—the *only* chip engineered for both grinding and burnishing. Gives twice the life of other stones!

What makes it so tough? Aluminum-oxide mineral grains—*fused* with a ceramic bonding agent that never fractures or crumbles. And "Super Honite" *holds* these thousands of razor-sharp cutting edges permanently—*can't* wear smooth.

Try it yourself and see the difference. Available in eight sizes. Write Dept. DC-81 for the name of your nearest supplier.

ANOTHER 3M PRODUCT

## Regular "Honite" proves toughest natural chip

Competitive tests prove no other *natural* barrel finishing abrasive—not even granite—retains a cutting edge as long as regular "Honite!" Thousands of tiny, sharp silica grains are held tightly in a tough mineral bonding. Thousands of new cutting edges are constantly exposed as the surface slowly wears away.

That's why "Honite" is ideal for fine finishing to close tolerances, and for many other jobs involving a minimum amount of metal removal.

Insist on the brand name—"Honite." Available in nine sizes for uniform results. Write Dept. DC-81 for the name of your nearest supplier.

**"HONITE" COMPOUNDS** *are the "secret of success" for dependable finishing. Each type is carefully formulated to control alkalinity, lubrication, glazing—many other vital operating conditions. Ideal with "Honite" or "Super Honite."*

## *FREE help from Barrel Finishing Experts!*

Are you positive your present barrel finishing methods are giving you the best results at the least possible cost? Experienced 3M Engineers are ready to work with you for increased efficiency and a system that's tailored to your *particular* job. Use coupon below for complete information and a copy of "3M Barrel Finishing." No obligation.

Minnesota Mining & Mfg. Co.
Dept. DC-81, St. Paul 6, Minn.

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Honite BRAND

BARREL FINISHING CHIPS • COMPOUNDS • EQUIPMENT

Made in U.S.A. by MINNESOTA MINING & MFG. CO., St. Paul 6, Minn., also makers of "Scotch" Brand Pressure-sensitive Tapes, "Scotch" Sound Recording Tape, "Underseal" Rubberized Coating, "Scotchlite" Reflective Sheeting, "Safety-Walk" Non-slip Surfacing, "3M" Adhesives. General Export: Minn. Mining & Mfg. Co., International Division, 270 Park Avenue, New York 17, N. Y. In Canada: Minnesota Mining & Mfg. of Canada, Ltd., London, Canada.

*Circle No. 15 on Reader Service Card for more information.*

# NEW PRODUCTS

**For additional information on the products appearing on this and the following pages, mark the key number of the item on the card bound into this issue. Drop the card in the mail — no postage is required.**

## CHUCK FOR DRILL PRESSES

*2-Jaw Drill Chuck*

*Westcott Chuck Co., Oneida, New York*

SPECIAL FEATURES: This design, which is made for Westcott in Sweden, is the same as the former Westcott "Little Giant" 2-jaw drill chuck, Oneida model which was discontinued several years ago.

SPECIFICATIONS: Three sizes are available, 1/2, 3/4 and one inch. Morse taper arbors are also available for the chucks. The upper part of the chuck housing is reinforced with a steel collar.

***For additional information circle No. 92 on the Reader Service Card.***

## SPRAYS HIGH SOLID CONTENT MATERIALS

*Viscolator*

*Reliable Products Mfg. Co., Brooklyn, New York*

SPECIAL FEATURES: This device heats lacquers, synthetics and other high solid content materials so that they can be used in a spray gun. Solid contents are higher, making fewer coats necessary. No pressure tank is needed for spray gun.

SPECIFICATIONS: Capacities from 8 to 250 gallons per hour. Recirculating models are available. Smaller units are heated by electric coils, larger ones by steam. Will heat materials to 180 F in 15 to 20 minutes. Delivery to spray gun is by air or electrically driven pump. Heated air can be provided if desired.

***For additional information circle No. 93 on the Reader Service Card.***

## VARIABLE SPEED TAPPING MACHINE

*Model 2F*

*Edlund Machinery Co., Cortland, New York*

SPECIAL FEATURES: This machine has an infinitely variable spindle speed between the limits of 200 and 2700 rpm. Speed changes are made with a handle controlled mechanism, with an indicating dial to show running speed.

SPECIFICATIONS: Additional speeds of 50 to 675 rpm are available with back gears. Machines are available with 1,2,3,4,6 or 8 spindles, in pedestal or round column types, and with 8 or 15 inches overhang distance from face of column to center of spindle.

***For additional information circle No. 94 on the Reader Service Card.***

## PROTECTS THREADS DURING PLATING

*Caplugs*

*Duggan Masking Devices, Detroit, Michigan*

SPECIAL FEATURES: These plugs and caps are made to prevent build up on threads during plating. They are made to plug holes or cap studs.

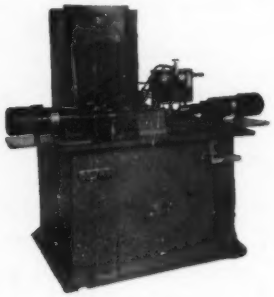
SPECIFICATIONS: Sizes are available to plug holes from 1/8 to 5/8 and to cap studs from 3/32 to 3/8. Material is pressure molded neoprene. Plugs are tapered both inside and out to speed use and assure a firm grip.

***For additional information circle No. 95 on the Reader Service Card.***

## SPEEDS RADIAL HOLE TAPPING

*4 Unit Tapping Machine*

*Govro-Nelson Co., Detroit, Michigan*



SPECIAL FEATURES: Illustrated unit was made up of four Model ST tapping units to tap four 5/16-18 holes in a bracket. By varying the number and positions of the units, this machine can be adapted to other parts.

SPECIFICATIONS: Operator loads machine manually, energizes start switch, part is automatically clamped, tapped and unclamped. Production rate is approximately 480 pieces per hour.

***For additional information circle No. 96 on the Reader Service Card.***

## RECTIFIER FOR ELECTROPLATING

*Types N150VP and N150BQ*

*Electronic Rectifier Co., Inc., Rochester, New York*

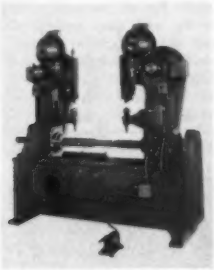
SPECIAL FEATURES: These rectifiers are the selenium type, designed for the electroplating and electrochemical industries. They have a full wave rectifier circuit with voltage continuously variable from 0 to 8 volts DC at 150 amps capacity, or 0 to 16 volts DC at 75 amps capacity.

SPECIFICATIONS: DC voltmeter and ammeter are 3 1/2 inch rectangular panel type with D'Arsonval movements and two percent accuracy. Fully magnetic circuit breaker. Steel cabinet with hinged top cover for access to AC terminal strip. Size is 22" wide by 18" deep by 25" high. Weight 160 pounds.

***For additional information circle No. 97 on the Reader Service Card.***

## SETS RIVETS AUTOMATICALLY

*Dual Rivitor*
*Tomkins-Johnson Co., Jackson, Michigan*



SPECIAL FEATURES: This machine, designed to save time and labor in assembly and riveting, is equipped with 10 inch hoppers and tooled to feed and set two 1/4" diameter by 5/8" long box head rivets at a time.

SPECIFICATIONS: The machine consists of two 8 inch Model R Rivitors, mounted face to face on a common base, adjustable for rivet spacings from 2½ inches to 18 inches center to center. One motor drives both flywheels, which are synchronized by a combination gear and chain drive arrangement. Both clutches are tripped by solenoids connected to a single foot switch.

***For additional information circle No. 98 on the Reader Service Card.***

## GRINDER HAS TILTING SPINDLE

*Master Spindle Sander and Grinder*
*Kindt-Collins Co., Cleveland, Ohio*

SPECIAL FEATURES: The spindle on this machine can be tilted up to 45 degrees, allowing the operator to keep the work in a horizontal position. Machine can be oscillating if desired.

SPECIFICATIONS: Powered by a 2 hp constant speed electric motor, with speed settings of 2000 and 4000 rpm. Takes abrasive sleeves from 1/4 to 4 inches, and 6 to 11 inches in length; also grinding wheels up to 5 inches in diameter and 5 inches high. A built-in safety device prevents use of the high speed range with the large diameter units.

***For additional information circle No. 99 on the Reader Service Card.***

## MICROSCOPE CHECKS TOOLS

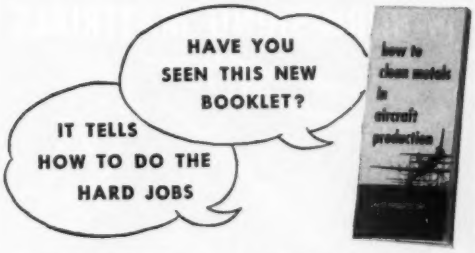
*P. G. Cutter Grinder Microscope*
*J. Arthur Deakin & Son, Jamaica, New York*

SPECIAL FEATURES: This English-made microscope was designed to check the accuracy of engraving cutters used in die-sinking machines. It can also be used for checking radii, forms and angles of engraving tools, small twist drills and similar objects which carry an irregular shape at the end of a cylindrical shank.

SPECIFICATIONS: The instrument is a 15 power microscope with a detachable reticle on which are drawn lines for checking tools. Special reticles can be made to individual requirements. Both the eyepiece and the objectives are interchangeable to vary the total magnification of the instrument.

***For additional information circle No. 100 on the Reader Service Card.***

*(Continued on Page 52)*


Better cleaning cuts costs in aircraft production. This 48-page illustrated booklet outlines all the big cleaning jobs. Have you seen the latest Oakite recommendations on:

¶ How to clean aluminum before anodizing? *See page 4.*

¶ How to prepare aluminum for spot welding? *See page 10.*

¶ How to prepare aluminum for painting? *See page 15.*

¶ How to clean aluminum before and after heat treating? *See page 20.*

¶ How to strip paint from aluminum? *See page 22.*

¶ How to select and install cleaning tanks, rinse tanks, and spray-washing machines? *See pages 31 to 35.*

**FREE** For a copy of *"How to clean metals in aircraft production"* write Oakite Products, Inc., 34G Thames St., New York 6, N. Y.

*Technical Service Representatives in Principal Cities of U. S. & Canada*

**OAKITE** SPECIALIZED INDUSTRIAL CLEANING MATERIALS • METHODS • SERVICE

*Circle No. 24 on Reader Service Card.*

**2 DUMORE DRILL HEADS**
**cut multiple-drilling costs in half**

*for Omco Products Corporation*

**PROBLEM:** This Ohio subcontractor was getting only 90 pieces per hour, drilling 3 holes in a small airplane part. Set-up used was a tumble jig and a 4-spindle multiple drill head.

Would you pay $200 to save $5,000 a year . . . $400 to save $10,000? Sure you would. And that's the kind of savings users of small drills are getting with the new Dumore Automatic Drill Head.

**SOLUTION:** Output was doubled and costs cut from $10.95 to $5.82 per thousand by set-up shown above. One Dumore head drills from left, one from right, and handpress from above. Hand trip controls Dumore heads.

You'll have to be the judge of how much this revolutionary tool can save you, because only you know your problems. That's why we're urging you to write for the facts Today!

*Write for free* **CERTIFIED REPORT**

**COMPLETE JOB DATA** by an unbiased research organization

**The DUMORE Company**
Dept. H-76 • RACINE, WISCONSIN
Export Address: 13 E. 40th St., New York, N.Y., U.S.A.

*Circle No. 17 on Reader Service Card for more information.*

## PRODUCTION TAPPING SIMPLIFIED

*Lead Screw Tapping Attachment*
*Automatic Methods, Inc., Newark, N. J.*

**SPECIAL FEATURES:** This unit is built to be attached to any standard 14 to 15 inch drill press having a 2¾ inch column. It permits precision tapping at production rates even by unskilled operators. Company claims unskilled worker can perform tapping operations on this device equal in quality to that produced on a precision lathe.

**SPECIFICATIONS:** Lead screw and split nut mechanism provide tapping feed. Lead screws and nuts are stocked in pitches of 20-24-28-32, 36-40-44-48, 56-64 and 72-80. Jacobs Rubberflex collet takes taps up to ¼". Designed for use with any standard tapping head.

***For additional information circle No. 101 on the Reader Service Card.***

## CONTROL OF ABRASIVE BELT TRACKING

*Remote Control Arm*
*Behr-Manning Corp., Troy, N. Y.*

**SPECIAL FEATURES:** This unit gives operator control of abrasive belt tracking at all times. It eliminates down-time in cases where belt guards must be removed in order to adjust alignment.

**SPECIFICATIONS:** This equipment is designed for use in conjunction with the Delta Idler Unit. It is an angular adjustment mechanism with a remote control arm carried to the front of the machine. The company claims that the control arm is especially valuable in backstand belt operations where belts and wheel of 1½" and narrower are used.

***For additional information circle No. 102 on the Reader Service Card.***

## SAFETY STRESSED IN TUMBLING UNIT

*Model DW-60-36-2 automatic tumbling machine*
*Roto-Finish Company, Kalamazoo, Mich.*

**SPECIAL FEATURES:** New features make this tumbling machine more automatic and enable the operator to work in greater safety. Push-button operation, automatic timer and remote control handle for adjusting speed are incorporated.

**SPECIFICATIONS:** Safety switch prevents machine from operating whenever reinforced safety gate is raised. Patented cam locks on doors have spring-loaded pressure releases to prevent excessive build-up within the machine. Motor is mounted at rear for safety, motor protection and ease of maintenance.

Unit has jogging provisions and magnetic reversing starter with 110 volt control transformer. Once the machine is started, automatic timer will stop operation any time from 0 to 20 hours without further attention.

Each of two compartments has 18 cu. ft. capacity. Built of 3/16" steel; side supports, motor mount and floor are integral parts of frame. Cylinder shafts mounted in 2-7/16" self aligning ball bearing pillow block; cylinders are made in jigs for perfect alignment; shafts are double supported with gussets and bells.

***For additional information circle No. 103 on the Reader Service Card.***

## WEAR-RESISTANT CENTERS

*M-40-U Centers*
*Gorham Tool Co., Detroit, Mich.*

**SPECIAL FEATURES:** New wear and abrasion resistant material M-40-U used for centers said to outlast high speed and other alloy centers.

**SPECIFICATIONS:** Core of M-40-U induction brazed onto steel center shaft; centers and half centers available with Morse, Jarno, or Brown and Sharpe tapper shanks; lengths 3-⅝" through 12-¾".

***For additional information circle No. 104 on the Reader Service Card.***

## MULTIPLE CUT MILLING

*Newfield Universal Fly Cutter*
*Newfield Machined Parts Co., Los Angeles.*

**SPECIAL FEATURES:** Fits all standard arbors and turns at any required speed for fly and gear cutting, slotting, surface and straddle milling and disk and gasket cutting. Eliminates special cutters for each job. Permits four to six cuts in one operation on many types of milling.

**SPECIFICATIONS:** Four stock sizes, 4", 6", 8" and 10", and extra heavy duty 6" and 8" sizes are available. Uses standard high speed steel or carbide bits. Bit holders can be turned 270°. Holders take bits from 5/16 to ½ in diameter. Bits are held by one Allen screw. Holders are cast Meehanite.

***For additional information circle No. 105 on the Reader Service Card.***

## REMOVAL OF SMUT AND TRIPOLI

*Emulso-Clean Process*
*Magnus Chemical Co., Garwood, N. J.*

**SPECIAL FEATURES:** This process can be used by metal finishers who are having difficulty obtaining trichlorethylene or perchlorethylene. It is said to be specially effective in the removal of smut, lithopone, chalk, tripoli, chlorinated and sulphurized oils and other contaminants.

**SPECIFICATIONS:** This process uses Magnusol, an emulsion cleaner which is supplied in concentrated form. When mixed with a safety solvent it forms a neutral, oil and water soluble penetrating that is non-flammable at working temperature. Mixture is one part Magnusol and eight dipped or sprayed for 30 seconds. The mixture is non-toxic, non-corrosive and non-irritating.

***For additional information circle No. 106 on the Reader Service Card.***

***it's the SHAPE that counts!***

For fast, efficient barrel burnishing of small parts, stampings and castings, use Abbott Burnishing Materials. They're *shaped* to do the job right!

Abbott Burnishing shapes—Ball, Ovalball, Cone, Diagonal, Pin—are scientifically designed to make effective contact on parts of any size and shape. Each is made from high quality, Abbott bearing ball steel, deep hardened and polished to a mirrorlike glass hard finish. For the most satisfactory burnishing results . . . use ABBOTT.

*Useful information on barrel finishing is given in the Abbott Catalog-Manual. Write for your copy.*

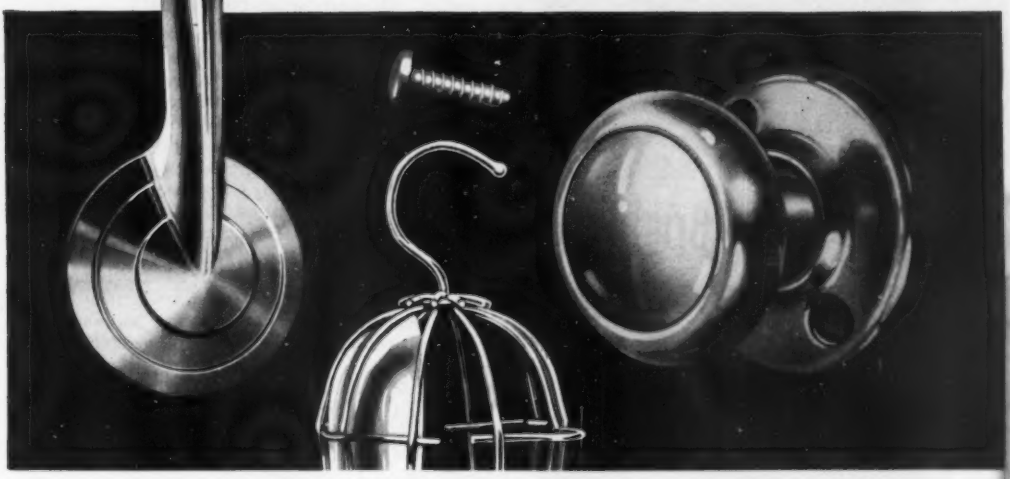
ABBOTT

**THE ABBOTT BALL COMPANY**
**1084 New Britain Ave.**
**Hartford 10, Conn., U.S.A.**

*Circle No. 9 on Reader Service Card for more information.*

*Yes—you can get*

# a bright finish like this



## . . . with only .0003" of zinc plate and UNICHROME CLEAR DIP

No need to abandon the selling power of a sparkling finish on your product. If you can use zinc you can still get a bright finish—and a high grade one, at that. For Unichrome Clear Dip not only brightens zinc plate to *chromium-like* brilliance, but also gives it substantial resistance to corrosion, dulling and fingermarking.

If your products are subjected to exposure, handling or humidity, include an application of Unichrome Clear "Enamel" B-115. It pays off in longer life. The Clear Dip Finish gives you an excellent base for this high gloss, non-yellowing, corrosion-resisting synthetic. This finishing system, consisting of Unichrome Clear Dip plus B-115, has been used with outstanding success for years on die castings, wire goods, ice skates, bicycle parts and other products and components.

The Unichrome Clear Dip Process forms its finish chemically. It's *fast, economical, easily controlled,* and *adaptable* to manual or automatic operation. Write for Bulletin CD-3.

**UNITED CHROMIUM, INCORPORATED**

100 East 42nd St., New York 17, N. Y.
Waterbury 20, Conn. • Detroit 20, Mich. • Chicago 4, Ill. • Los Angeles 13, Calif.
In Canada: United Chromium Limited, Toronto, Ont.

**You can easily meet Government specifications on chromate conversion coatings.** It's easy to produce chromate finishes on zinc plate or zinc die castings with Unichrome Dips. You get black, yellow or olive drab coatings from solutions that have, to well known users, actually proved to be more economical than the "home-made" solutions replaced. Consult us on your defense finishing requirements.

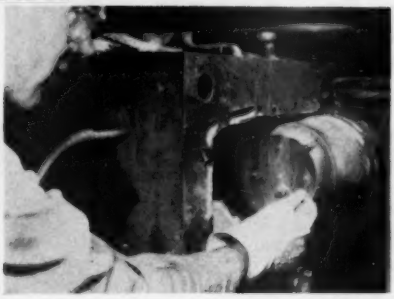
UNICHROME
Trade Mark

# COATINGS for METALS

*Circle No. 25 on Reader Service Card for more information.*

HOUGHTON
Mouldlubric 306

BRUSH ON EASILY!



Makes Castings Brighter!

SPRAY ON TOO!

Keeps Moulds Cleaner!

*THIS SPECIAL DIE CASTING LUBRICANT* is silvery in color—not black like ordinary types. It was developed by Houghton's research staff to safely withstand today's high pressure moulding. It provides outstanding lubrication despite intense heat.

*MOULDLUBRIC* 306 gives you other benefits even more unusual. This heavy oil lubricant contains aluminum powder. Mould cleaning is simplified. Castings stay bright and clean. They are ready to use if no special finish is specified!

*GET COMPLETE INFORMATION* on Mouldlubric 306 by writing E. F. Houghton & Co., Philadelphia 33, Pa. Or ask the Houghton Man, when he calls.

Steps Up Production!

MOULDLUBRIC 306
. . . a product of
E. F. HOUGHTON & CO.
PHILADELPHIA · CHICAGO · DETROIT · SAN FRANCISCO

Ready to give you on-the-job service . . .

# INDUSTRY NEWS

## GLENVALE PRODUCTS SOLD TO UNIVERSAL DIE CASTING

Purchase of the Glenvale Products Corporation, Detroit die casting plant, by Universal Die Casting & Manufacturing Corporation, Saline, Michigan, has been announced by Clifford H. Simmons, Universal president. Simmons stated that the acquisition of the Glenvale plant is a part of Universal's extensive expansion plans.

Mr. Simmons said that Universal's wholly owned subsidiary, Utilex Manufacturing Corp., has completed a new plant in Fowlerville, Mich., which will be occupied this week. He said that the Glenvale plant, formerly owned by J. A. Mullen, will be operated as a division of Universal and will continue to manufacture die cast component parts for the automotive and electric refrigerator industries. Production of die cast plumbing hardware and commercial castings will begin at the Fowlerville plant next week.

Mullen is a director of Standard Accident Insurance Company, a vice-president and director of the United Foundation of Detroit, and for the past several years has been a member of the Security Panel of the United States Atomic Energy Commission.

## NAMES NEW BELLOWS OFFICERS

Herbert B. Link, executive vice-president since 1939 of the Bellows Co., Akron, Ohio, manufacturers of pneumatic equipment, has been named president of the company. Mr. Link succeeds L. F. R. Bellows who died May 28.

H. B. Link

L. F. R. Bellows, Jr., Detroit, Michigan, has been named vice-president, and Byron D. Kuth, of Cleveland, Ohio, secretary-treasurer. The same officers were likewise named for The Bellows Electric Sign Corporation, and Bellows Products, Inc., affiliated companies.

## U. S. REDUCTION CO. ADVANCES TWO MEN

R. W. Tompkins, sales manager, has announced the appointment of Richard S. Neufeld as assistant to the sales manager of the U. S. Reduction Co., producers of

aluminum alloy ingot and reoxidizing aluminum. Main offices of the company are located at East Chicago, Indiana.

Mr. Neufeld joined the firm in 1948 after receiving his M.B.A. from the University of Chicago. He has been sales representative for three years in the upper midwest area with headquarters in Chicago.

Succeeding Mr. Neufeld as sales representative is Howard S. Bowen. Mr. Bowen received his B.S. in Chemical Engineering from Purdue in 1938 and has been active in the foundry field ever since. Just prior to affiliating with the U. S. Reduction Co. he was sales representative for four years for Aluminum Industries.

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### ACME BUILDS NEW PLANT

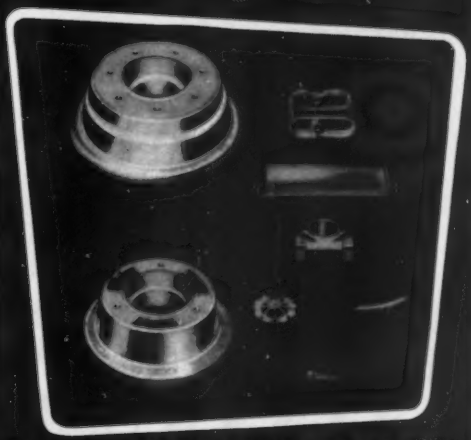
The Acme Manufacturing Company, manufacturers of automatic polishing and buffing machines, have moved

New Acme Plant

to a recently completed new plant located at 1400 East 9 Mile Road, Ferndale, Michigan, a suburb of Detroit which has attracted many manufacturing industries.


NEXT TO THE AIR ITSELF

MAGNESIUM and ALUMINUM Die Castings are Lightest



Ranging from .015 thick automatic pilot parts to thick stressed landing wheels, Die Castings by LITEMETAL are not only light but tough and durable. Some of them are required to be virtually free of surface imperfections and internal porosity.

LITEMETAL is proud of the part it plays in making America strong through air power. Whether the part is just a lid to keep the dust out or is a vital part in a fighter plane, LITEMETAL DICAST engineers are ready to assist in the selection of process, alloy and design.

Die casting with these new light metal alloys offers to manufacturers greater opportunities to lower production costs and the weight of their products. Also, these metals allow more freedom of design and offer greater scope in carrying out the designers' ideas. In addition, these die castings save many man-hours of finishing time.

Die Castings of magnesium or aluminum may offer you solutions to many of your cost and production problems.

LITEMETAL DICAST, INC. is an organization of specialists—men thoroughly experienced in the casting and machining of magnesium and aluminum alloys—the new metals of structural design.

Write today for literature and design information.

Quick action on inquiries.

LITEMETAL DICAST, Inc.

A DIVISION OF HAYES INDUSTRIES

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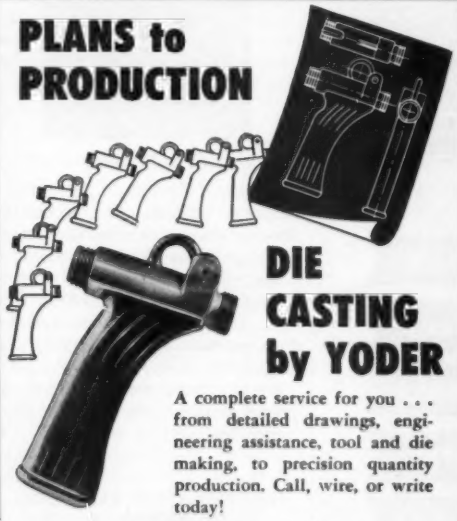

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### DU PONT ANNOUNCES THREE PROMOTIONS

Appointment of John W. Nestor as assistant manager of the Finishes Division of the Du Pont Co., has been announced by Matt Denning, manager of the division. The company also announced that Joseph B. Dietz has been promoted to assistant director of sales, and William P. Fisher has been given the post of manager of industrial sales.

### BATTELLE INSTITUTE CREATES NEW POST

Dr. Bruce W. Gonser has been appointed to a newly created assistant directorship at the Battelle Memorial Institute, Columbus, Ohio. He will be in charge of the less common metals there. The Institute currently has a budget exceeding one million dollars a year for research on these metals.

Dr. Gonser, who holds degrees from Purdue University, University of Utah and Harvard University, has been with the Institute since 1934, after being associated with the American Smelting & Refining Co., the Superior Zinc Corp. and the National Radiator Corp. He is known for his contributions to the technology of tin, zinc, cadmium, chromium, antimony and several of the less common metals.

Dr. Gonser has been active for many years in the Tin Research Institute, the Electro-chemical Society, the American Institute of Mining and Metallurgical Engineers, the American Society for Metals and the American Society for Testing Materials.


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### T. R. WILLIAMS APPOINTED

W. J. Cluff, president of Frederic B. Stevens, Inc., Detroit, Michigan, has announced the appointment of Thomas R. Williams as sales engineer in the plating and polishing department. Williams will represent the Stevens line in eastern Ohio, with headquarters at Elyria, Ohio.

T. R. Williams

Mr. Williams graduated with a B. S. in Chemistry from Alma College, Alma, Michigan. He has also done graduate work in Chemistry at Wayne University, Detroit.

He is at present a member of the Detroit Branch of the American Electroplater's Society.

### DIVERSEY CORP. PROMOTES SALES, TECHNICAL MEN

R. J. Stell, director of the Technical Development Department of The Diversey Corporation, Chicago, since 1948, has been named assistant to W. E. Noyes, general sales manager.

Frederick B. Hermann, assistant director of the Technical Develop-

ment Department succeeds Mr. Stell as director, while Donald V. Hannibal has been appointed assistant director, of the department.

Mr. Stell joined Diversey in 1946 as an engineer in the Technical Development Department. Prior to joining Diversey, Mr. Stell had been development chemist for E. I. Du Pont de Nemours.

Mr. Hermann, a chemistry graduate of University of Chicago, has been with Diversey since 1947. Mr. Hannibal, also a member of the Diversey staff since 1947, is a graduate of Northwestern University.

### M. L. HAVEY RETIRES FROM NEW JERSEY ZINC

Marshall L. Havey, having reached retirement age, has resigned as executive vice president of the New Jersey Zinc Co., effective July 31, 1951, according to a company announcement.

Mr. Havey will continue with the company on a part time basis as assistant to the president.

### HOLLERAN PROMOTED

Martin J. Holleran has been named assistant manager of tool steel sales by the Carpenter Steel Company, Reading, Pa. Mr. Holleran joined Carpenter in 1946 and served as sales engineer at the company's New York City mill-branch warehouse until his recent promotion.

### AWARDED SCHOLARSHIP

Joseph W. Distel of Wyndmoor, Pa.. has been awarded the first college scholarship provided for sons and daughters of employees of the Pennsylvania Salt Manufacturing Company by George B. Beitzel, company president.

Mr. Distel, who graduated from Springfield High School, Erdenheim, Pa., with an A average and an outstanding record of school achievement, is the son of Mr. and Mrs. Francis E. Distel of 801 Abington Avenue, Wyndmoor. His mother is an employee at Pennsalt's Whitemarsh Research Laboratories.

Mr. Distel was selected to receive the scholarship by a committee of prominent Philadelphia educators not connected with the company. Selection was made on the basis of College Entrance Board examinations, scholastic record and citizenship.


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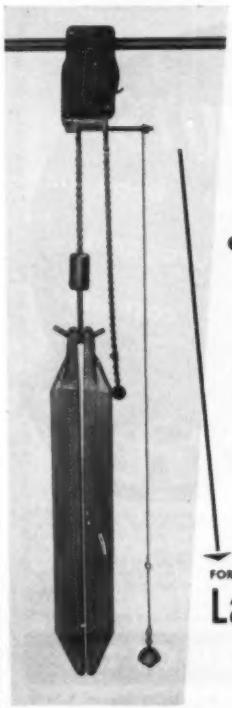

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## ANNOUNCES CHANGES IN METALLURGICAL POSITIONS

George V. Luerssen, formerly chief metallurgist, has been appointed vice president in charge of metallurgy by the Board of Directors of The Carpenter Steel Company, Reading, Pa. He succeeds B. H. DeLong, who announced his retirement as vice president and technical director after 41 years of continuous service with the company. DeLong, a member of the Board of Directors, will continue his activity with the company in that capacity.

Other advancements announced were those of Dr. Carl B. Post who succeeds Luerssen as chief metallurgist, and George E. Brumbach who advances to the position of metallurgist to succeed Post.

Mr. Luerssen brings to his new position a varied and extensive background of experience and achievement. He started with The Carpenter Steel Company in 1907. Under his guidance the Research and Metallurgical Departments have contributed much to the technical progress of specialty steels, including the development of free-machining Invar, refinements in the magnetic properties of 30% nickel temperature compensator alloys, procedures for closely controlling the hardenability and fine grained structure of carbon steels.

## ASSEMBLY SURVEY

*(Continued from Page 41)*

where studs or screws are grouped, angle brackets and latching type.

Another use for bosses in assembling are as integral rivets. Particularly when die cast in zinc, either solid or hollow bosses make excellent rivets. Thus, the parts are assembled with the die cast bosses extending through holes in the mating component, and the heads are then riveted, peened or spun over for permanent assembly. This has been a standard method for fastening the two die cast halves of automobile horns for many years.

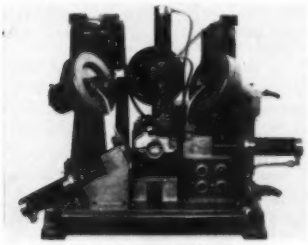
Variations of the cold-working method of assembling also include the staking of die cast edges, such as crimping a bezel to hold a dial or glass. It is also possible to set a name plate or other part into a recess formed in the die casting, and attach it firmly by staking the edges of the recess in two or three spots.

By using die castings which have

accurately located bosses or pads, the mounting surfaces can be minimized, with resultant saving in metal. It is often possible to hold the height of several mounting bosses close enough that they can be used for mounting without machining the tops, or, at most, with a light milling cut.

*UTILIZING INSERTS:* Where a screw type fastening into a die cast piece may be subjected to severe stress, corrosion or repeated assembling and disassembling, it is sometimes desirable to protect the hole with an insert.

This is entirely practical by using inserts of other metals, either cast in position during the die casting proc-



TO INSERT THREE LEAD BALLS to seal carburetor parts prior to final assembly, this special machine equipped with three 8-inch hoppers is used. Photo courtesy Detroit Power Screwdriver Co.

ess, or pressed in subsequently. The outside diameter of round inserts is usually knurled, milled, slotted or otherwise machined to form an anchor if they are to be cast in place.

By the use of an insert, screw threads of bronze, steel or other material can be coupled with the accuracy, complex shapes and other advantages of die casting as a fabricating process.

Combining the advantages of the cored hole, as discussed previously, with those of an insert of another metal, it is often practical to drive a screw thread insert into a cored hole to provide the added strength, corrosion resistance and resistance to stripping.

Two methods of accomplishing this are widely used. In one method, the cored hole is tapped and then a helical wire insert of phosphor bronze or stainless steel is driven into the female threads with the use of a special tool*. In the other method, a special screw thread insert of tool steel, threaded both inside and out-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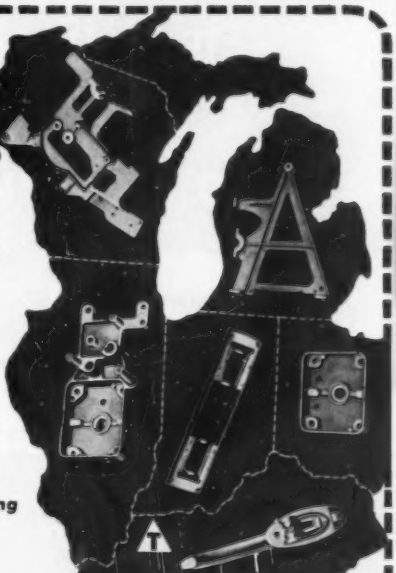

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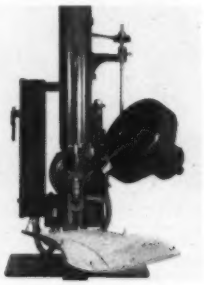
mon, tubular push-in type, twin type for making two fastenings at a time side, is driven into the untapped hole, cutting its own thread as it is driven. This type of insert has advantages similar to those described for tapping screws, in that it is unnecessary to machine the threads in a separate operation.

*SPECIAL ASSEMBLY EQUIPMENT:* While the same types of assembling machinery and equipment can be used for die castings as for other types of metal components, there are certain groups of devices which have been found to be especially suited for handling die cast parts.

Among these may be included hopper-fed power screwdrivers, small hydraulic presses for staking or heading, small tapping heads for converting single spindle drill presses into



SOMETIMES IT IS PREFERABLE to drive studs into die castings, rather than to attempt to cast them as inserts. Here a stud setter tool is mounted on the power screwdriver spindle to drive small studs into untapped holes in a die cast auto grille. Photo courtesy Detroit Power Screwdriver Co.

efficient tapping machines, and air cylinders for holding, positioning and feeding parts during assembly.

Automatic hopper-fed power screwdrivers save considerable time required to place and drive screws manually, and can also be used for such operations as nut driving or stud driving. They are adapted for use with machine screws or tapping screws, with or without assembled lockwashers.

Hopper screwdrivers are available in both bench and floor models. These machines automatically feed screws in correct position, and drive them to the correct depth and tension.

Special considerations to be taken into account in designing die cast parts that are to be assembled by one of these power screwdriving units include allowing clearance for the hold-

ing fingers which position the screws. Minimum clearance around the head of any screw is about 1/16" per side. For a nut or hex head, the clearance for standard socket wrench is used.

Another basic consideration in designing the castings for assembly is the matter of an entry point free of obstructions for the tool to be used. Wherever possible, holes for fasteners should be located in surfaces which are readily accessible.

In summary, it should be emphasized that the non-ferrous metals which can be die cast lend themselves to certain types of fastening devices; the additional characteristics of the die casting process such as accuracy, coring of holes or forming of bosses and studs, also suggest certain specific methods of assembling.

The product designer who visualizes the final assembly problems at the same time he is working out the mechanical details of his product, and who is familiar with the tools and materials at his command, will undoubtedly do the best job, save the most money in production operations, and will find shortcuts that save time.

## CLOSE TOLERANCE

*(Continued from Page 25)*

third, specifications concerning dimension, flatness and sealing surfaces would be more difficult to attain.

The cover casting could not be produced with the valve section as an integral part of a one-piece unit by any other commercially feasible method.

When a product, manufactured in large quantities for the consumer market, needs accuracy of a high order for more or less intricate shapes, die casting is likely to provide the production answer. At The Anderson Company, the use of two basic types of die cast housing parts has simplified manufacturing and assembly practices.

Another type of part found to be practical by this company as die castings is the fitting which encases the small worm and pinion of the control cable, illustrated in Figure 4.

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## WELL HANDLED

*(Continued from Page 19)*

ing piece traveling on a screw thread, in a manner similar to that used in a vise.

### Fish Rod Reels

Machining on the handle is very simple. After flash removal, the cored holes are tapped and the piece either buffed on a wheel or barrel finished. The natural brightness of polished aluminum makes further finishing unnecessary. As mentioned before, a milling operation is sometimes used to provide a lock for the reel prong. On some reels, holes are drilled to avoid a difficult coring problem.

Large numbers of these handles are made and sold in this country. One manufacturer buys over 200,000 die cast handles every year. Die casting the handles has enabled the sporting goods companies to give fishermen sturdy, attractive products at prices well within the reach of the modest budget.

## HELICAL INSERTS

*(Continued from Page 44)*

### INSERTS USED IN ROTATING TOOL

A typical application of these inserts is their use in the die cast aluminum housings of the Ingersoll-Rand rotary electric Impactool, see Figure 2. Here, they are used to provide durable female threads for the three bolts that hold the housings together.

Depending upon the particular model of Impactool, one of three sizes of Heli-Coil inserts—10-24, 1/4-20, or 5/16-18—is installed. Insert lengths of 1-1/2 times the bolt diameter are sufficient to insure that, if turned to breaking, the bolt will be caused to break rather than the threads to strip.

Inserts are installed at production rates in the following manner: after the aluminum housing is correctly positioned in a multi-spindle drilling machine, three pilot holes are drilled with #8 (0.199-in.) drills for the 10-24 threads, 17/64 (0.265-in.) drills

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for the 1/4-20 threads, or 21/64 (0.328-in) drills for the 5/16-18 threads.

Next, slightly oversized receiving threads, to accommodate the outside diameters of the inserts, are tapped with roughing and finishing taps labeled "10-24 Heli Coil", "1/4-20 Heli-Coil", or "5/16-18 Heli-Coil."

When these operations are completed, the housing components are delivered to an assembly bench for installation of the inserts. Here, power-driven inserting tools prewind and install the inserts in the housings to the proper depths (one-quarter to one-half a coil below the surface of the casting).

Because these are blind holes, the inserting tang on the insert need not be removed. This tang fits into the slotted mandrel of the inserting tool and is used to turn the insert into the hole. When the hole is to be a through-hole, the tang is removed with a tang break-off tool. However, in this application, it was not necessary.

These lightweight Impactools were designed for a multiplicity of assembly operations. Standard attachments readily adapt these tools to the following operations: screw driving, nut running, drilling, reaming, tapping, step-drilling, hole sawing, stud driving, wire brushing, masonry drilling and other operations.

Although they are similar to conventional direct-torque portable tools, in that they use motors and gear reducers, their operation is quite different.

For example, when driving a nut, the run-down is similar to but faster than that of a direct-torque tool until the nut begins to tighten. From here on, the impact mechanism comes into action and seats the nut with rotary impact blows.

The impact mechanism eliminates torque reaction to the operator and prevents overloading or stalling of the motor. Thus, these tools can be lighter in weight than the standard direct-torque tools and still have the same capacity.

To design toward this end, all parts used must have a high strength-weight ratio and must be vibration-resistant, Heli-Coil thread inserts were specified because they meet these requirements.


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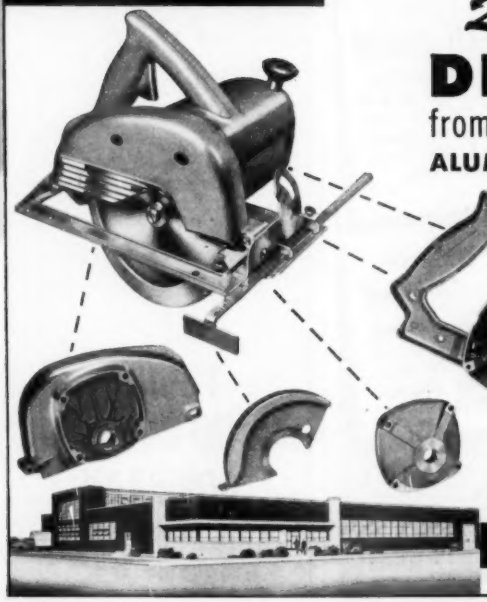

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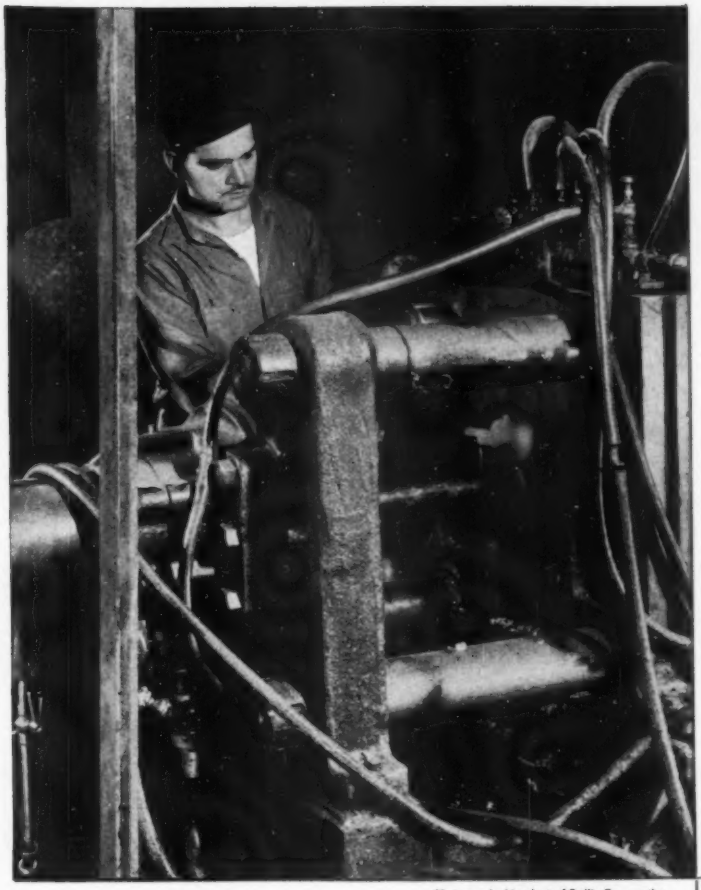

*Photographed in plant of Dallin Corporation.*

# Pydraul F-9 means safety

Pydraul F-9, Monsanto's nonflammable-type hydraulic fluid, means *greater safety* for employees, *greater safety* for equipment, *greater safety* for buildings.

This greater safety comes from the nonflammability of Pydraul F-9, which has demonstrated resistance to flammability in numerous tests such as these:

**Pydraul F-9 did not flash or ignite when sprayed, dripped or flooded on molten metal heated to approximately 1,500° F.**

**Pydraul F-9 did not flash or ignite when sprayed, at 1,000 p.s.i., into the 6,000° F. zone of an oxyacetylene welding torch flame.**

In addition to safety, Pydraul F-9 offers *economy* and *efficiency*. It shows high resistance to mechanical shear and chemical breakdown. It is an excellent lubricant which does not corrode metals ordinarily used in building machines requiring fluid power-transfer mediums.

Write for Monsanto Technical Bulletin No. 0-75 and see what Pydraul F-9 has to offer you in *greater safety* and in assurance of uninterrupted mobilization production. MONSANTO CHEMICAL COMPANY, Organic Chemicals Division, 1749-F South Second Street, St. Louis 4, Missouri. *Pydraul: Reg. U. S. Pat. Off.*

DISTRICT SALES OFFICES: Birmingham, Boston, Charlotte, Chicago, Cincinnati, Cleveland, Detroit, Houston, Los Angeles, New York, Philadelphia, Portland, Ore., San Francisco, Seattle. In Canada, Monsanto (Canada) Ltd., Montreal.

**PYDRAUL F-9**

**Physical and Chemical Properties**

| | |
|---|---|
| Appearance | Clear, oily liquid |
| Color | Light amber (APHA 350) |
| Specific Gravity | 1.266 |
| Weight per Gallon | 10.56 |
| Acidity (mg. KOH/gm.) | Less than 0.1 |
| Odor | Mild, pleasant |
| Pour Point | +5° F. |
| Hydrolysis Stability | Neut. No. less than 0.1 before and after hydrolysis. |
| Antogenous Ignition Point | Above 1100° F. |
| Viscosity at 100° F. | 49.5—58.0 Centistrokes 229—269 S. U. S. |
| at 210° F. | 5.6—6.0 Centistrokes 44.5—45.8 S. U. S. |

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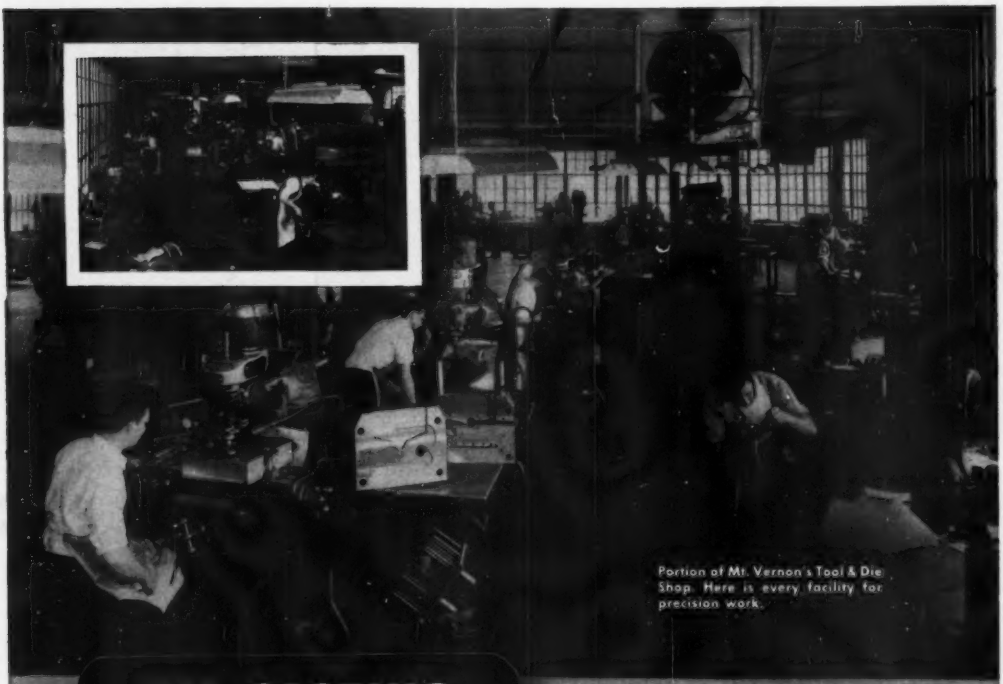

Portion of Mt. Vernon's Tool & Die Shop. Here is every facility for precision work.

## DIE CASTING

# Dependability is Assured here!

At Mount Vernon, we have completely coordinated designing, engineering and die building facilities *under one roof.* The activities of our modern and extensive die shop are closely integrated with those of other departments, with the result that long-life, accurate dies—yielding clean, flawless castings—are assured.

When considering a manufacturing procedure, therefore, remember not only the outstanding economies inherent in die casting, but also

### Mount Vernon's Complete Four-Fold Service

***(1) Consultation*** — M. V. can help you with design and production problems by making recommendations based upon your specific requirements.

***(2) Die Making*** — M. V's up-to-the-minute tool and die shop equipment, plus long experience and highly skilled personnel, assure a dependable source for quality dies.

***(3) Castings*** — M. V. castings, meeting ADCI standards, are guaranteed "on grade" at all times.

***(4) Machining*** — M.V. machining facilities can handle every machining operation that castings may require.

We shall welcome the opportunity to serve, and assist you—as we have assisted many others —to increase your output, improve your products, and *hold down your production costs.*

**MT. VERNON**
DIE CASTING CORP.
MT. VERNON, NEW YORK